Technical Note No. 41

**THE DEMAND FOR CURATIVE
HEALTH CARE IN RURAL ECUADOR**

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ABSTRACT

This study uses multivariate and econometric analysis to examine the demand for modern health care in rural Ecuador, as part of a larger assessment of the *Seguridad Social Campesino (SSC)*, the government's voluntary social insurance and health care system for the nation's rural population. The analysis uses the results of a household survey of 1,017 rural households and a survey of nine SSC clinics to determine the potential effect of policy options, such as improving the quality of health care, increasing the rate of referrals to higher level facilities, and increasing user fees on SSC's three major goals: 1) to increase utilization of SSC health facilities, 2) to expand membership, 3) to promote the financial sustainability of the SSC. The overall conclusion of the study is that investing in improved quality of care, especially by increasing the availability of drugs in the clinics, and having user fees cover the full costs of these quality improvements would simultaneously promote all three of the SSC's goals.

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PURPOSE AND SCOPE

Upon request from USAID/Ecuador, the HFS Project conducted an assessment of Ecuador's *Seguridad Social Campesino (SSC)*—the government's voluntary social insurance and health care system for the nation's rural population, which is financed in part by a payroll tax on urban workers. As part of this assessment, HFS conducted an analysis of the demand for health care among the target (rural) population of the SSC. The aim of the demand analysis is to help the SSC to better understand why the utilization of SSC health services is low and has been declining over time. The analysis used data from a survey of 1,017 households in nine areas throughout the country served by SSC clinics, as well as data on inputs and services from the nine selected clinics.

The study examines the potential effect of certain policy options and demographic or socio-economic factors on three of SSC's major objectives: 1) to increase utilization of SSC facilities; 2) to expand membership in the SSC; and 3) to promote the financial sustainability of the SSC. The policy options examined include: reducing out-of-pocket costs of using SSC services (for members and/or non-members), improving the quality of health care at SSC clinics, using fee increases to pay for quality improvements, reducing the SSC membership dues, and increasing the rate of patient referrals to more sophisticated facilities run by the *Instituto Ecuadoriano Seguro Social (IESS)*, the country's social security system for urban workers.

METHODOLOGY

The study involved using three empirical models to estimate the impact of these variables and policy options on: 1) the decision to join the SSC, 2) the decision to seek care outside of the home, 3) the choice of health provider. The study focuses on the demand for curative (versus preventive) services. To analyze the effect of quality of care on demand, a quality of care index was developed, based on respondents' ratings of six characteristics of health care services: waiting time, convenience of hours, availability of drugs, availability of medical equipment, quality of treatment, and the perceived competency of medical staff. Data from facilities on drug and physician labor inputs were also used to construct quality measures.

FINDINGS

The major findings on the specific factors affecting the demand for SSC services are:

- ▴ *SSC Membership Status*: SSC members were significantly more likely to seek care for an illness and to visit an SSC facility than non-members. This finding, which is consistent with a large body of health economics research showing that insurance has a positive effect on levels of health care utilization, suggests that expanding SSC membership

would be an effective means of increasing utilization of SSC facilities, at least for curative care services.

- ▲ *__Perceived Quality of Care__*: A strong positive association was found between the perceived quality of care and both the decision to join the SSC and the probability of selecting a given provider. The availability of drugs was the aspect of quality that most affected demand. These results suggest that improving the quality of care in SSC clinics would be an effective way to increase both SSC membership and the utilization of SSC services among current members.

- ▲ *__Expected Out-of-Pocket Fees__*: The effect of charging fees for consultations and drugs on utilization of SSC services was found to be relatively small (fees appear to be charged to some extent at SSC clinics despite an official policy of no fees). These results suggest that a policy of decreasing out-of-pocket costs would do little to increase utilization of SSC services. The study also showed that introducing or raising user fees to pay for quality improvements would increase both membership and utilization, given the strong positive effect of quality on demand and the relatively weak negative effect of user fees.

- ▲ *__Referral Rates__*: A positive and significant relationship was found between a clinic's rate of referrals to higher level health facilities and the decision to join the SSC. This suggests that one reason households join the SSC is to gain access to IESS facilities.

- ▲ *__Other Factors__*: Poorer households were more likely to be SSC members and to visit an SSC clinic than wealthier households, suggesting that SSC services are viewed as a low-cost, low-quality form of health care. As expected, education of the household head (particularly secondary education) was positively and significantly related to the decision to seek care, but did not affect the choice of provider. Distance and travel time to a health facility were not found to significantly affect one's decision to seek care, but did affect one's choice of provider (i.e., people tended to seek the closest provider). The analysis also found that people who had attended SSC promotional meetings or presentations were no more likely to seek care for an illness than those who had not.

CONCLUSIONS AND POLICY IMPLICATIONS

In sum, the findings suggest that there may exist considerable potential to increase SSC membership and overall utilization by improving the quality of care, particularly by increasing the drug supply and the number of physician hours of service, and perhaps by increasing referrals. Further, the low sensitivity of demand for services to modest changes in patients' out-of-pocket expenses suggests that it may be possible to finance these quality improvements through a combination of increased dues and user fees.

Referrals

Econometric analysis was used to estimate the demand response to increases in referrals, to improvements in quality and to increases in fees. Increasing the referral rate to attract additional members would be expected to involve some trade-offs between these objectives. For example, increasing the referral rate from its sample mean of 5.1 percent to 8 percent (the highest observed value among the sample clinics) would increase clinic membership by almost 17 percent, which would in turn increase revenues per clinic by around 1.6 million sucres. However, because of the greater costs of treating

patients at more sophisticated IESS facilities, such a policy would increase the costs per clinic by a greater amount (approximately 2.8 million sucres), thereby worsening the typical clinic's net income. Alternatively, if out-of-pocket fees to members were increased sufficiently to cover the estimated shortfall, utilization rates would decrease by an estimated one percent. Therefore, a policy of increasing the referral rate, paid for again by increasing user fees, would lead to increased membership, with no adverse impact on financial sustainability, but would produce a small decrease in utilization rates.

Quality of Care Improvements

In another policy simulation, it was assumed that the SSC increased the quantity of drugs and the number of physician hours provided in SSC clinics from the sample mean to the level of the best supplied clinic to test how this would affect utilization and costs. The analysis showed that if the costs of the quality improvement were not passed on to patients, the probability of seeking modern care would rise from 0.81 to 0.93. The costs of making these improvements would be about 7,400 sucres per household. If these costs were passed on through user fees, the probability of seeking care would rise slightly less, from 0.81 to 0.90, because the positive effect of quality improvements on utilization is partially offset by the negative effect of price increases.

A similar policy simulation was conducted using the broader quality of care index and again raising consumer satisfaction from the sample mean to the highest rating achieved by one of the nine sample clinics—an increase of 14 percent in the quality of care index. The analysis suggested that this quality improvement would yield approximately a 13 percent increase in the proportion of the population affiliated with SSC and an 18 percent increase in the probability of an ill SSC member selecting an SSC clinic for treatment. The compound effect of this improvement of quality on affiliation and member behavior would be to increase utilization by about 33 percent.

The costs of these quality improvements were estimated to be about 8,600 sucres (US$4.20) per SSC member household. This represents a 167 percent increase in drug expenditures, but only about a 12.5 percent increase in the current cost of running a clinic per household (69,000 sucre [US$33.75]).[1]

Increasing user fees to cover these costs could be expected to decrease utilization by about five percent. However, because the quality improvements will increase utilization by an estimated 33 percent, the overall effect of user fees to pay for quality improvements would still be a 28 percent increase in utilization. Thus, with the assumed increase in quality (which is not necessarily the best level for SSC to seek), it should be possible to improve quality of care, cover the costs of those improvements through user fees, and substantially increase utilization. And, most important, the improved quality of care and the increased utilization should improve the population's health status.

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[1] It should be noted that central and regional administration costs are not included in this estimate. Had it been possible to include those costs, the estimated costs per household would be higher and the increase in costs for these qualitative improvements would represent a smaller percentage.

1.0 INTRODUCTION[1]

The purpose of this paper is to learn more about the factors which determine the level of utilization of services provided by Ecuador's rural social security (SSC) program (*El Seguro Social Campesino del Ecuador*). Of particular interest is the extent to which the quality of care in SSC dispensaries, as well as in their public and private sector competitors, affects both utilization and the decision to affiliate with SSC. The analysis is based on a 1994 survey of 1,017 households residing in the service areas of nine SSC dispensaries. This survey was conducted jointly by CEDATOS (*Centro de Estudios y Datos*), an Ecuadorean firm, and the USAID-funded Health Finance and Sustainability Project as part of a larger USAID/Ecuador-supported study of the SSC.

1.1   BACKGROUND

SSC, which was founded in 1968, provides basic protection to a segment of the rural population against risks associated with illness, maternity, old age and disability. It is financed mainly from the contributions of enrollees and employers affiliated with the urban-based Ecuadorean Social Security Institute (IESS). SSC members are enrolled through a variety of local organizations, such as rural cooperatives, large farms and community organizations. SSC provides a limited package of primary health services to its 822,809 members through a network of 549 7-room dispensaries staffed by physicians (general practitioners) and nurse auxiliaries (CEDATOS, 1994, 14). In addition, SSC members have access to IESS specialty and hospital services located in urban areas through a referral system.

The current goals of SSC include increasing utilization, expanding coverage, diversifying financial support, and placing greater emphasis on preventive health care:

- ▲   One of SSC's principal goals is to increase utilization of dispensary services by SSC members. Only 27 percent of SSC affiliates visited a dispensary in 1991, averaging only 0.8 visits per affiliate. Utilization rates for both curative and preventive care have also been declining since 1980.

- ▲   Another SSC goal is to expand coverage to a larger share of the rural population. A goal established in 1980 to have 1 million affiliates by 1985 has not yet been achieved.

- ▲   Another SSC objective is to expand and diversify its sources of financial support. Options include charging user fees to members or charging higher dues to the employers and other organizations which sponsor SSC enrollees.

- ▲   Finally, SSC wants to place greater emphasis on preventive health. Currently, curative care accounts for approximately 80 percent of SSC services.

SSC officials seek a better understanding of why current levels of utilization are so low and declining. Explanations offered have included: (1) long distances in many cases between affiliates' places of residence and dispensaries; (2) patient preferences for other types of providers (e.g., traditional healers,

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private clinics); and (3) the lack of outreach services and health promotion activities by dispensary personnel. It is also reported that physicians do not keep regular hours in some dispensaries, so that affiliates may travel long distances only to find that the physician is absent.

1.2   OBJECTIVES OF STUDY

The objectives of the current study are to:

- ▲   investigate the willingness of SSC affiliates to pay a higher share of the costs of the health care they receive

- ▲   identify the factors which determine the demand for health care and the choice of provider among both the insured and uninsured populations

- ▲   identify effective policy options to increase the utilization of SSC dispensaries and to finance the expansion of SSC services to a larger segment of the rural population, particularly the poor.

1.3   THEORETICAL MODELS

SSC facilities provide mainly primary curative care and preventive care. The present study focuses on the demand for curative care in SSC facilities, which currently account for approximately 80 percent of SSC services. Although some SSC non-members receive care at SSC facilities, most SSC services are consumed by SSC members. Accordingly, the proportion of the population who are affiliated with SSC is an important determinant of the level of utilization experienced by SSC facilities. More generally, the rate of utilization of SSC facilities is determined by the following factors:

- ▲   the proportion of the population who become ill

- ▲   the proportion of the population who are affiliated with SSC

- ▲   the proportion of the SSC affiliated and non-affiliated ill who seek care outside the home

- ▲   the proportion of those seeking care who select an SSC facility as their provider

Both the decision to seek care outside the home and the choice of an SSC facility as provider are closely related to SSC affiliation. SSC affiliation amounts to health insurance, significantly reducing the out-of-pocket costs to members of consuming health care provided by SSC facilities. SSC affiliation is expected, therefore, to increase both the overall rate of non-home treatment for illness and to increase the proportion of care received at SSC facilities. It has been said that an important motive households have for joining SSC is to gain access to IESS facilities on referral. If this is true, increasing the proportion of patients referred to IESS facilities should increase both membership and utilization.

The available policy options include:

- ▲   reduce the dues charged for SSC membership (this should increase SSC membership and increase utilization)

- improve the quality of care at SSC facilities (this should increase SSC affiliation as well as raise the proportion of the ill who both seek care outside the home and select an SSC dispensary as their provider)
- increase the referral rate at SSC dispensaries (this should increase SSC affiliation as well as increase the rate of utilization by members)
- lower the out-of-pocket costs of SSC care to SSC members (this should increase the proportion of ill SSC members who seek care outside the home and who select an SSC provider)
- lower the out-of-pocket costs of SSC care to SSC non-members (this may increase their likelihood of seeking care outside the home and of selecting an SSC provider, but it may also reduce their likelihood of becoming affiliated with SSC).

Some combination of the above policies may be most effective in achieving SSC's objectives. For example, a policy to improve the quality of care at SSC facilities might be linked to higher out-of-pocket charges in order to finance the quality improvements.

The present paper estimates empirical models of the demand for health care and SSC affiliation which are designed to provide information about the likely effectiveness of the above policy options. The theoretical specification of both models is discussed below.

1.3.1   The Demand for Health Care

The demand for health care (M) is hypothesized to be a function of a set of expected money and time prices (P), the perceived quality of care (Q), income (Y), health status (H), health insurance coverage (I), and a set of socio-economic variables (Z):

$$M = M (P, Q, Y, H, I, Z) \qquad\qquad (1\text{-}1)$$

The demand for health care is also assumed to be negatively related to price and health status and positively related to quality of care, health insurance coverage, and income. The vector of socio-economic variables (Z) relevant to the demand for health care includes age, sex, and education. We expect that the demand for health care is: (1) non-linearly related to age (i.e., higher for young children and the aged); (2) higher for males than for females (due to possible gender discrimination in household decision-making); and (3) positively related to education.

We estimate two empirical models of the demand for health care. The first concerns the decision to seek care away from home when ill and is discussed in section two. The second empirical demand model is concerned with the choice of provider when ill (including the home care option) and is discussed in section three.

1.3.2 The Decision to Affiliate with SSC

In addition to the demand for health care, we are interested in modeling the decision to become affiliated with the SSC. Households joining SSC pay dues and receive benefits in the form of free or subsidized health care, both at SSC dispensaries and at IESS facilities on referral. We hypothesize that the decision to affiliate (A) with SSC is a function of the cost of SSC affiliation (C), the difference in the expected out-of-pocket costs of health care between SSC members and non-members (PDIFF = PRSSC - PRNSSC), the difference in the perceived quality of care at SSC facilities and at preferred non-SSC facilities (QDIFF = QSSC - QNSSC), the proportion of SSC-member patients referred to IESS facilities (R), income (Y), health status (H), and a set of relevant socio-economic factors (Z):

$$A = A(C, PDIFF, QDIFF, R, Y, H, Z) \qquad (1\text{-}2)$$

We expect that the decision to affiliate with SSC is negatively related to the cost of SSC member-ship and to the difference in the expected out-of-pocket costs of health care between SSC members and non-members, and positively related to the proportion of SSC-member patients referred to IESS facilities and to the difference in the perceived quality of care between SSC and non-SSC facilities. We expect the decision to affiliate with SSC to be negatively related to health status, since SSC membership is a form of health insurance. The relationship of SSC affiliation to income is less clear. To the extent that SSC facilities provide a relatively low-cost, basic package of primary health care, as has been suggested, one would expect the decision to affiliate with SSC to be negatively related to income. We expect the following socio-economic variables to be related to the decision to affiliate with SSC: household size, the age and sex composition of the household, and the education and occupation of the head of household. We expect that SSC affiliation is more likely for larger households (for whom net benefits are higher), for households having relatively more young, old and male members (reflecting the relationship of age to health status and possible gender bias in the demand for health care), and for households in which the head of household is working in an occupation with a relatively high rate of SSC affiliation (e.g., agriculture). The relationship of SSC affiliation to education is indeterminate: more educated households are expected to have a higher demand for health care (which should increase the demand for health insurance), but they may also prefer to retain more freedom to select providers (i.e., not be effectively restricted to SSC providers).

An empirical model of the decision to affiliate with the SSC is specified, estimated, and evaluated in section four.

1.4 DATA

1.4.1 Household Survey

The household survey on which the present study is based was conducted in the service areas of nine SSC dispensaries. These areas were selected not to be representative of either the SSC system or of the country as a whole but rather to reflect the broad range of topographic and ethnic characteristics present in Ecuador. *Exhibit 1-1* provides a list of the SSC dispensaries which were sampled in the first stage of a stratified sampling process, as well as the number of households selected from the service area of each sampled dispensary in the second stage of the sampling process.

EXHIBIT 1-1 *SAMPLE CHARACTERISTICS*						
			Number of Households Sampled			
Sampled Dispensary	Province	Total Number of SSC Affiliates	SSC Affiliates	Non-Affiliates	Former SSC Affiliates	Total Sample
San Pablo 3	Guayas	762	93	26	7	126
El Aji	Manabi	431	61	60	10	131
S. Antonio de Alao	Chimborazo	243	90	14	29	133
Llactahurco	Cotopaxi	228	90	27	4	121
Tumbunuma	Loja	371	77	11	4	92
Uzhar	Azuay	306	64	67	9	140
Quingue	Esmeralda	188	39	26	15	80
Campanacocha	Napo	140	60	4	0	64
San Vicente 3	Manabi	344	60	60	10	130
Totals		3,013	634	295	88	1,017

One problem with the sampling scheme was that an effort was made to sample dispensaries which serve different ethnic and language groups. Consequently, several of the dispensaries selected are closely identified with one language or ethnic group (see *Exhibit 1-2*). Since only nine dispensaries were sampled, this raises the possibility that ethnicity and language may be proxying for variations in the supply environment as well as for the intended individual- and community-level socio-cultural effects.

EXHIBIT 1-2 ETHNIC AND LANGUAGE COMPOSITION OF HOUSEHOLDS BY SAMPLED DISPENSARY					
	Ethnicity			Language	
	Mixed	Indian	Black	Spanish	Quechua or Quechua/ Spanish
San Pablo 3	125	1	0	125	1
El Aji	131	0	0	130	1
S. Antonio de Alao	5	128	0	89	44
Llactahurco	9	112	0	121	0
Tumbunuma	81	10	1	91	1
Uzhar	102	38	0	138	2
Quingue	43	0	37	78	2
Campancocha	20	44	0	0	64
San Vicente 3	130	0	0	130	0

Approximately 120 households were drawn randomly from lists compiled of households residing within the service area of each sampled SSC dispensary, with the sample further stratified according to the following three categories of households: (1) current SSC affiliates; (2) former SSC affiliates; and (3) households never previously affiliated with SSC. A total of 1,017 households were enumerated between July 27 and August 19, 1994. In each case, the person interviewed was either the head of household, his wife, or another adult family member.

The questionnaire collected data on the location of the household (i.e., coded information was limited to the location of the closest SSC dispensary); characteristics of the respondent (age, sex, marital status, ethnic group, language); information on the age and sex composition of the household (grouped into five age categories); education, income, and occupation of the head of household (but not of other household members); household income and expenditures; and housing characteristics (availability of electricity, source of water supply, type of latrine).

The health information collected in the survey consisted of information on illnesses experienced by household members during the preceding two months (i.e., type of illness [12 categories], the age and sex of the family member who was ill [again, grouped into five age categories], duration of the illness, whether work was lost on account of the illness, whether and where care was obtained, how much was paid for consultations and drugs, whether the person was cured or referred elsewhere) and on any preventive care obtained by household members during the preceding two months (i.e., type of care [prenatal/delivery, well-baby, family planning, environmental health, school health, vaccinations, other], where obtained, how much was paid, the age and sex of the person receiving the care, and the primary reason for selecting the provider).

In addition, a wide array of information was collected on providers. The provider information was collected in separate sections of the questionnaire for two distinct categories of households: (1) households currently affiliated with SSC; and (2) households not currently affiliated with SSC.

▴   For SSC members, information was collected on the physical accessibility of the nearest SSC dispensary (distance from residence, time required to go there, means of transport used, and the amount paid for transportation); the amount and timing of dues paid for SSC membership; information on the most recent visit (type of provider seen, time taken, whether medications were provided by SSC or, if not, where they were ultimately obtained); perceived quality of various aspects of care obtained at the SSC dispensary (location, hours, waiting time, treatment received, staff capabilities, availability of medicines and equipment, and the perceived effect on the individual's health); hours of work by each category of staff; perceived advantages and disadvantages of using SSC facilities; willingness to pay for improved services (as well as preferred types of quality improvements and the amount respondents were willing to pay for quality improvements); health promotion activities of the SSC dispensary (whether an SSC doctor has visited the respondent's home recently, awareness of and attendance at recent SSC health promotion meetings); and use of alternative facilities (type of facility, reason for use).

▴   Non-affiliates and former affiliates were asked to identify their preferred source of health care (general hospital, private clinic, health center/subcenter, SSC dispensary, traditional healer, cooperative, other) as well as alternative sources. They were also asked similar information to SSC members about the physical accessibility and perceived quality of care of their preferred provider (but not about their willingness to pay for quality improvements). In addition, former affiliates were asked why they left SSC, whether they would be interested in rejoining, and what changes would need to be made before they would rejoin. Similarly, respondents not previously affiliated were asked whether they were interested in joining SSC, why they had not previously joined, and what changes would have to be made before they would join. Additionally, both non-affiliates and former affiliates were asked whether they had other health insurance (none of the respondents did in fact report other types of health insurance).

There are a number of important limitations of this data set for demand analysis, some of which are as follows:

▴   The number of geographical clusters from which the sample was drawn (nine) is very small. This limits the usefulness of the survey for multivariate statistical analysis. Classical statistical techniques assume that the observations in a sample are statistically independent (i.e., they are drawn randomly). When the observations are drawn from a cluster, they are no longer statistically independent, and this poses problems in interpreting statistical estimates. For example, in linear regression, cluster sampling produces error terms which are correlated across individuals; and ordinary least-squares (OLS) estimates of the standard errors (used in testing hypotheses or in constructing confidence intervals) become biased. If the number of clusters is large (e.g., several hundred, as in the typical DHS survey), the degree of bias is relatively small. With only nine clusters, however, the standard errors are significantly biased. Fortunately, there are methods readily available to correct for this bias (Greene, 1993, 391). However, one

consequence of the sampling scheme is that the estimates obtained are less precise than they would have been had the number of clusters been larger.[2]

▴ Another problem with the survey is that no data were obtained directly on prices and travel costs (e.g., time, distance, out-of-pocket costs) for providers other than the preferred provider. Similarly, quality assessments were limited to the nearest SSC dispensary, in the case of SSC members, or to the preferred (literally, "generally used") provider, in the case of non-members. As a result, the expected prices, travel costs, and quality assessments had to be imputed for other providers. Since the use of imputed values undoubtedly introduces substantial measurement error, this is an additional source of expected bias in the estimates (probably, but not necessarily, biasing the estimated coefficients of price and quality toward zero).

▴ There is only limited information in the survey (and even less was actually coded) on the individual characteristics of household members (e.g., age, sex, education). Instead, the survey provides summary information on the number of household members by sex and for five age groups (0-1, 1-5, 6-14, 15-49, 50+). Information on education is limited to the head of household. Information is provided in similarly grouped form for individuals reported to have been ill and who obtained preventive care. This limitation in the data makes its use impractical to examine the factors which determine: (1) the probability that an individual becomes ill; or (2) the probability that an individual seeks preventive care.

▴ All price, expenditure and income data were grouped, so that it is not possible to know exactly what was spent for various types of health care. This means that certain variables are measured with a greater degree of error than would have been the case had the values been coded as reported.

On the other hand, the data set has several advantages for use in demand analysis, including:

▴ the availability of quality assessments for a variety of health providers

▴ information on the type, duration, and severity of illness

▴ strong representation within the sample of households having insurance coverage (i.e., SSC members).

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[2] It is recognized that there is always a tradeoff between the number of clusters, which increases the precision of statistical estimates for a given sample size, and the cost of conducting a survey. The optimum choice in a given context depends on the degree of intra-cluster correlation and travel costs, as well as the ultimate use of the data (Cochran, 1963, 288-290).

1.4.2   Facilities Survey

In addition to the household survey, each of the nine SSC dispensaries in the sample was visited to collect data on inputs, costs, and services delivered during the calendar year 1993. Some of these data were used in the present study and are presented in *Exhibit 1-3*.

Facility	Drugs Consumed (thousands of *sucres*)	Supplies Consumed (thousands of *sucres*)	Hours Worked by Doctors (hrs./yr.)	Proportion of Patients Referred	Number of SSC Member Households
San Pablo 3	2,720	248	1120	0.080	762
El Aji	886	194	746	0.016	431
S. Antonio de Alao	834	101	492	0.075	243
Llactahurco	1,147	112	523	0.046	228
Tumbunuma	793	68	402	0.064	371
Uzhar	1,292	191	711	0.055	306
Quingue	1,694	999	255	0.035	188
Campanacocha	521	231	446	0.045	140
San Vicente 3	764	194	832	0.031	344
MEANS (N=9)	1,184	260	614	0.050	335

EXHIBIT 1-3
SELECTED DATA FROM FACILITIES SURVEY, 1993

2.0 THE DECISION TO SEEK HEALTH CARE

2.1 INTRODUCTION AND DESCRIPTIVE DATA

As indicated above, two alternative empirical models are used to study the demand for health care. The first examines the factors determining the decision to seek care from any provider as compared to the option of home treatment and is discussed in the present section. The second model is concerned with which of several alternative providers is selected, as compared to the home treatment option, and is discussed in the following section.

The primary advantage of the decision-to-seek-care model discussed in the present section over the choice of provider model discussed in the following section is its relative simplicity. Although it does not explain which provider is selected, the simpler model yields much useful information about the factors which determine the utilization of SSC facilities. Since SSC members have a strong tendency to visit SSC facilities when ill, one obvious way to raise levels of utilization of SSC facilities is to have a higher proportion of SSC members seek care outside the home when ill. The primary policy instruments available to SSC to increase the level of utilization of its facilities by SSC affiliates are reductions in the out-of-pocket cost of SSC services (including medications) and improvements in the quality of care at SSC facilities.

The 1,017 households surveyed reported that a total of 1,284 household members were ill during the preceding two months. *Exhibit 2-1* lists the types of illnesses reported, including the average length of illness (in days), whether work was lost, and whether medical care outside the home was sought. Infections (including parasites), respiratory, and digestive disorders account for 65.2 percent of the reported illnesses, although they tend to be of significantly shorter duration than other types of illness (about 2 weeks versus 3 weeks for other types of illness). Care outside the home also tends to be sought less often for respiratory and digestive disorders (65 and 71 percent of the time respectively), as compared to infections (84 percent) and other types of illness (typically 80-90 percent). For the 311 persons reported ill who did not seek treatment, the most common reasons given were: person treated self (214 persons), other (unspecified) reasons (53 persons), distance too great (12 persons), hours inconvenient (11 persons), and medications unavailable (8 persons).

Exhibit 2-2 shows where those reporting illness sought care, according to whether they were SSC affiliates or non-affiliates at the time of the survey. These data show clearly that:

- ▲ SSC affiliates seek care outside the home more frequently when ill than do SSC non-affiliates (79 percent as compared to 67 percent)

- ▲ When seeking care outside the home, most SSC affiliates (more than three-fourths of the of the 79.4 percent seeking outside care) are treated at SSC dispensaries

EXHIBIT 2-1 TYPE AND AVERAGE LENGTH OF REPORTED ILLNESSES, WHETHER WORK WAS LOST AND WHETHER CARE WAS SOUGHT				
Type of Illness	Mean Length of Illness (days)	Whether Work Was Missed (percent)	Whether Care Away from Home Was Sought (percent)	N
Infections/parasites	12.6	36.7	84.1	252
Tumors	19.3	40.9	81.8	22
Endocrine/nutritional disorders	21.5	37.5	86.1	72
Blood disorders (e.g., anemias)	20.4	33.3	88.9	72
Mental disorders	14.2	40.0	80.0	16
Nervous system disorders (e.g., eye/ear infections)	21.6	46.8	79.8	110
Circulatory system disorders	19.8	35.8	75.3	81
Respiratory disease	12.0	31.8	64.6	397
Digestive system disorders	14.7	46.7	70.8	186
Genito-urinary disorders	20.1	45.0	92.5	41
Accidents	17.5	71.4	85.7	29
Other (unspecified)	16.9	33.3	50.0	6
ALL ILLNESSES	15.37	38.4	75.6	1,284

EXHIBIT 2-2 DISTRIBUTION OF THOSE REPORTING ILLNESS BY TYPE OF CARE SOUGHT AND BY SSC AFFILIATION/NON-AFFILIATION				
Type of Care Sought	SSC Affiliates		Non-Affiliates	
	Percent	N	Percent	N
Home care/no care	20.6	188	33.1	123
SSC dispensary	60.7	554	11.6	43
Public health center/subcenter	5.5	50	18.0	67
General hospital	3.7	34	14.0	52
Private clinic	5.6	51	19.1	71
Traditional practitioner	1.1	10	1.1	4
Midwife	0.1	1	0	0
Other (unspecified)	2.6	24	3.2	12
ALL SOURCES OF CARE	100.0	912	100.0	372

▲ A much smaller percentage of SSC non-affiliates seeking care outside the home (17.3 percent of the 66.9 percent seeking outside care) select an SSC dispensary as their provider when ill; they are more likely to select either a public health center or subcenter (26.9 percent), a general hospital (20.9 percent), or a private clinic (28.6 percent). Interestingly, only about 1 percent of those reported ill are treated by traditional practitioners.

Exhibit 2-3 summarizes the fees paid for health care by those reported ill, according to the type of care sought and according to whether or not the household was affiliated with the SSC at the time of the survey. These data show that:

▲ the out-of-pocket expenditures of SSC affiliates for both consultations and medications are only about one-third as much as those of SSC non-affiliates;

▲ SSC affiliates pay only about one-fifth as much as non-affiliates when treated at an SSC dispensary; and

▲ the bulk of health care spending, among both SSC affiliates and non-affiliates goes for medications (approximately 80 percent)[3]

The main reason that SSC members pay less for their medical care is that they seldom pay for consultations when treated at an SSC dispensary (94 percent of SSC members who were treated at SSC dispensaries reported that they paid nothing for consultations) and in most cases receive subsidized medications directly from SSC dispensaries. For example, 87 percent of SSC members who required medications in connection with their treatment at SSC dispensaries received their medications from the SSC dispensary. Most of those who did not receive their medications from the SSC dispensary (88 percent) had to buy them at a private pharmacy, where they had to pay on average 127 percent more.

The survey asked SSC members several questions about the nearest SSC dispensary, including: (1) its distance from their home; (2) the time and cost involved in going there; and (3) the mode of transport used. SSC members were also asked to rate their nearby SSC dispensary according to a set of six quality indicators. Similar questions were asked of SSC non-members in relation to their preferred source of health care. These quality assessments were coded 2 for "good," 1 for "normal," and 0 for "bad," and were summed to produce an index of overall quality (ranging between 0 and 12). The responses on distance, travel time, and travel cost—together with the quality-of-care index—are reported in *Exhibit 2-4* for different categories of provider. These data show that there is a quality-accessibility tradeoff facing much of the sample. Respondents rate the quality of care higher in both general hospitals and private clinics, as compared to that in both SSC dispensaries and public health centers/subcenters; but the former are almost twice as distant on average from the respondents' place of residence, with out-of-pocket travel costs reported to be commensurately higher.

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[3] However, it should be pointed out that SSC affiliates pay additionally an average annual membership fee of 13,047 *sucres*.

EXHIBIT 2-3 AVERAGE FEES PAID FOR CONSULTATIONS AND MEDICATIONS BY TYPE OF CARE SOUGHT AND BY SSC AFFILIATION/NON-AFFILIATION				
	SSC AFFiliates		SSC Non-Affiliates	
	Fee for Consultations	Fee for Medications	Fee for Consultations	Fee for Medications
Home/no care	46	995	4	1,164
SSC dispensary	538	3,296	3,023	17,048
Public health center/subcenter	1,408	9,300	3,358	13,877
General hospital	3,591	21,471	5,442	30,250
Private clinic	10,784	28,284	10,056	27,465
Traditional practitioner	10,611	18,222	666	0
Midwife	7,500	22,500	—	—
Other	5,604	16,104	8,150	22,700
ALL PROVIDERS	1,420	5,761	3,913	15,096

EXHIBIT 2-4 AVERAGE DISTANCE, TIME AND TRAVEL COSTS FROM PLACE OF RESIDENCE TO NEAREST FACILITY AND INDEX OF QUALITY OF CARE				
Type of Facility	Distance (kilometers)	Travel Time (minutes)	Travel Costs (*sucres*)	Quality of Care (index)
SSC dispensary	5.18	36.8	638	9.57
Public health center/subcenter	3.64	22.4	380	9.60
General hospital	8.34	41.8	1,188	10.22
Private clinic	8.73	38.9	1,000	10.04
ALL PROVIDERS	5.66	36.5	719	9.70

In the remainder of this section, we specify and estimate an empirical model to explain the decision to seek health care away from home on behalf of household members reported to have been ill. The purpose of this analysis is to determine the factors which affect this decision. In particular, it is interesting to know how SSC membership affects the decision to seek health care and the extent to which the effects of SSC membership operate through price (i.e., the fact that SSC members have lower out-of-pocket costs for health care). The analysis also tries to elucidate the role played by quality of care in affecting the decision to seek medical care. Are SSC members more likely to seek care when ill if they consider the quality of care to be relatively good at their nearest SSC dispensary? Do SSC non-members behave similarly with respect to their preferred providers? The analysis of the decision to seek care is also expected to provide information on a number of other interesting questions, including: (1) to what extent does household income affect health care utilization? (2) does the age or sex of the person reported ill

affect the likelihood of seeking care? (3) What role does education play in the decision to seek health care? (4) What about the severity and duration of illness?

2.2 EMPIRICAL MODEL OF THE DECISION TO SEEK CARE

The decision to seek care by (or on behalf of) a household member reported to have been ill during the preceding two months is modeled as a logit analysis, with the log odds of seeking health care assumed to be a linear function of a set of relevant explanatory variables (**X**):

$$\log [PRSEEK_i/(1-PRSEEK_i)] = \alpha + \beta X_i \qquad (2-1)$$

where

PRSEEK is the probability of seeking care outside the home from any provider

α and β are fixed parameters to be estimated (β is actually a set of parameters)

the subscript i refers to a household member with a reported illness (or to the household to which individual i belongs), and

X is a set of explanatory variables, including:

PRICE	expected price of health care at the household's preferred provider (in thousands of *sucres*)
QUALITY	an index of the perceived quality of health care at the household's preferred provider
INCPC	household income per capita (in millions of *sucres*)
SSCMEMB	binary variable indicating whether the household belongs to SSC (1 if yes, 0 if no)
LENGTH	length of illness (in days)
WORKLOST	binary variable indicating that work was lost due to the reported illness (1 if yes, 0 if no)
WIFE	wife (1 if person ill is the head's wife, 0 otherwise)
MCHILD	male child (1 if person ill is a male child under 15; 0 otherwise)
FCHILD	female child (1 if person ill is a female child under 15; 0 otherwise)
OTHER	other person (1 if person ill is other than a child, a male head of household, or the wife; 0 otherwise)
PRIMED	completed primary education (1 if the head of household has completed primary schooling or is literate but has not attended secondary school; 0 otherwise)
SECED	some secondary education (1 if the head of household has some secondary education, 0 otherwise)

We discuss each of these variables below in more detail:

PRSEEK. This is a dichotomous dependent variable, equal to one if a person reported ill sought health care outside the home and equal to zero if home care or no care was sought.

PRICE. This variable is an imputed measure (in thousands of *sucres*) of the out-of-pocket costs the household expects to pay for health care (including travel costs) at the nearest SSC dispensary (SSC members) or at its preferred category of provider (SSC non-members). The imputed price, which includes

fees for both visits and medications (but which does not include annual membership dues, in the case of SSC affiliates), is based on a regression of reported out-of-pocket costs incurred by those seeking care as a function of: type of preferred provider (interacted with location of residence and SSC affiliation [in the case of SSC dispensaries only]) and household income per capita. Imputed estimates of travel costs are added to the imputed money price. It is important to note that SSC membership is reflected in the expected price measure, so that a major impact of SSC membership on demand for health care may operate through the PRICE variable (but see discussion of the SSCMEMB variable below). [4] Since the theoretical variable is an expected price, imputed values are used for all observations (i.e., actual expenditures are not used even when reported).

QUALITY. This variable is a quality of care index constructed on the basis of subjective ratings provided by respondents of their preferred provider's: (1) waiting time (WAIT); (2) perceived staff qualifications (STAFF); (3) perceived quality of treatment provided (CARE); (4) availability of medications (MEDS); (5) availability of medical equipment (EQUIP); and (6) convenience of hours (HOURS). A rating of "good" on a given quality dimension receives a score of 2, "normal" receives 1, and "bad" receives 0. Accordingly, the quality index ranges between 0 and 12. In addition to the QUALITY index, individual quality of care components are also used in some regressions. For example, a categorical variable BADMEDS is equal to one if the availability of medications was reported to have been "bad," and zero otherwise.

INCPC. Annual household income per capita (in millions of *sucres*).

SSCMEMB. This binary variable indicates whether the household is affiliated with SSC (1 if yes; 0 otherwise). SSC affiliation is expected to affect the utilization of health care in several ways. Its most important expected impact is via the PRICE the household expects to pay for health care (see discussion of PRICE above). In addition, it may be positively associated with health care utilization due to the effect of the health education activities of SSC staff on members' use of SSC facilities. SSC affiliation may also be associated with reduced price uncertainty (i.e., SSC members face less uncertainty regarding the cost of treatment as compared to non-SSC members since their out-of-pocket expenses are typically limited to drugs), and any reduction in uncertainty (with the average cost of care held constant) can be expected to increase the probability of seeking care (Knowles, 1995).

LENGTH. This variable is the reported length of illness in days. This variable may be endogenous, since the decision to seek care may affect the duration of illness. Accordingly, an instrument is used in place of LENGTH in some regressions.

WORKLOST. This binary variable indicates whether the household member has missed work as the result of the reported illness. It is a measure of the severity of the reported illness (i.e., a measure of health status). WORKLOST may also be endogenous, since whether work was missed may be affected by whether or not care was sought. Accordingly, an instrument is used in place of WORKLOST in some regressions.

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[4] In cases where the SSC dispensary is the preferred provider (all SSC members, by assumption, and 6 SSC non-members), the expected price differs depending on whether the household is affiliated with SSC.

WIFE. This binary variable indicates whether the household member reported ill is the wife of the head of household.

MCHILD. This binary variable indicates whether the household member reported ill is a male child under 15 (1 if yes, 0 if no).

FCHILD. This binary variable indicates whether the household member reported ill is a female child under 15 (1 if yes, 0 if no).

OTHER. This binary variable indicates whether the household member reported ill is other than a child, the mother or the head of household (1 if yes, 0 if no). Although age is not given, it is suspected that such other household members are predominantly older relatives of the head of household (the excluded category is the head of household).

PRIMED. This binary variable indicates whether the head of household has completed primary schooling, or is literate, but has not attended secondary school.[5]

SECED. This binary variable indicates whether the head of household has received some secondary education.

Means and standard deviations of the variables in the total estimation sample and in the subsample of SSC members are presented in *Exhibit 2-5*. The estimation samples are slightly smaller due to missing values on one or more of the specified variables.

2.3   ESTIMATION RESULTS

The results of maximum likelihood estimation of *Equation 2-1* are presented in *Exhibit 2-6*.[6] The results are presented for the full sample of individuals reported ill, as well as separately for SSC members and non-members. We focus attention on the results for SSC members, since these are most relevant to the objective of increasing the utilization of SSC facilities. The results for SSC members are also more reliable in the case of the price and quality effects, since the designation by SSC non-member respondents of a preferred provider is ambiguous, and because the sample size is considerably larger for SSC members as compared to non-members (N = 774 versus N = 282 for SSC non-members).

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[5] It would be preferable to specify the education of the person reported to have been ill (or the mother's education, in the case of children), rather than that of the head of household; but the survey only provided education information for the head of household.

[6] Due to the fact that cluster sampling was employed, the estimated standard errors are corrected using White's procedure (Greene, 1993, 391).

EXHIBIT 2-5 MEANS AND STANDARD DEVIATIONS OF THE VARIABLES USED IN THE ANALYSIS OF THE DECISION TO SEEK CARE					
VARIABLE NAME		Total Sample (N = 1056)		SSC Members (N = 774)	
		Mean	Standard Deviation	Mean	Standard Deviation
Proportion seeking care away from home	PRSEEK	0.766	0.424	0.806	0.396
Expected price of health care (thousands of *sucres*)	PRICE	9.012	12.043	3.211	4.453
Perceived quality of health care	QUALITY	9.741	1.915	9.612	1.943
Household income per capita (millions of *sucres*)	INCPC	0.027	0.028	0.023	0.019
Duration of illness (days)	LENGTH	15.226	10.298	15.75	10.435
Whether work lost due to illness (1 if yes; 0 otherwise)	WORKLOST	0.374	0.484	0.382	0.486
Whether male child under 15 (1 if yes; 0 otherwise)	MCHILD	0.207	0.406	0.204	0.403
Whether female child under 15 (1 if yes; 0 otherwise)	FCHILD	0.174	0.379	0.185	0.388
Whether wife of head of household (1 if yes; 0 otherwise)	WIFE	0.322	0.467	0.314	0.464
Whether other family member (1 if yes; 0 otherwise)	OTHER	0.044	0.204	0.041	0.199
Whether head of household has completed primary education (1 if yes; 0 otherwise)	PRIMED	0.428	0.495	0.443	0.497
Whether head of household has completed some secondary education (1 if yes; 0 otherwise)	SECED	0.125	0.331	0.111	0.314
Whether household is currently affiliated with SSC (1 if yes; 0 otherwise)	SSCMEMB	0.733	0.443	1.000	0.000

EXHIBIT 2-6 ESTIMATION RESULTS OF THE LOGIT ANALYSIS OF THE DECISION TO SEEK CARE Estimated Coefficients (asymptotic z-statistics)			
Variable	Total Sample	SSC Members	SSC Non-members
PRICE	0.0087 (0.96)	-0.0599 (-1.95)	0.0361 (2.49)*
QUALITY	0.0952 (1.72)	0.0996 (1.81)	0.0140 (0.30)
INCPC	0.4816 (0.16)	-2.0133 (-0.27)	3.2757 (0.91)
LENGTH	0.0519 (6.12)*	0.0486 (5.69)*	0.0622 (5.75)*
WORKLOST	0.9026 (3.53)*	0.5214 (1.82)	1.635 (6.05)*
MCHILD	0.8293 (3.71)*	0.9545 (3.11)*	0.6537 (2.04)*
FCHILD	0.3422 (1.26)	0.1878 (0.49)	0.6707 (1.52)
WIFE	0.3642 (1.86)	0.1257 (0.48)	1.0845 (4.17)*
OTHER	0.8347 (1.44)	0.6111 (0.80)	1.2613 (1.39)
PRIMED	0.1829 (1.122)	0.0017 (0.01)	1.0310 (3.72)*
SECED	0.8208 (3.52)*	1.4646 (3.44)*	0.4355 (1.62)
SSCMEMB	1.0127 (3.90)*	—	—
constant	-2.0864 (-2.93)*	-0.4820 (-0.64)	-2.8486 (-3.70)*
Pseudo R^2	0.11	0.09	0.20
N	1,056	774	282
* indicates estimated coefficient is statistically significant at the 0.05 level.			

The estimation results for SSC members are consistent in most respects with a priori expectations. The estimated coefficient of PRICE is negative and almost statistically significant at the 0.05 level, while that of QUALITY is positive but is statistically significant at only the 0.10 level. However, income is apparently an insignificant factor in the decision to seek medical care, particularly in the case of SSC members, where its estimated coefficient is negative and insignificant. Although one would expect income to have less of an effect on the decision to seek medical care among SSC members (since their out-of-pocket expenses are much smaller), it is surprising that there is no observed effect at all.[7]

The estimated effects of the duration (LENGTH) and intensity (WORKLOST) of illness are positive and statistically significant, as expected. As noted above, however, both variables may be endogenous variables, since both the duration and intensity of illness are likely to be affected by the decision to seek health care. However, one would expect endogeneity to bias the estimated effects toward zero (since one would expect those obtaining medical care to have shorter and less severe episodes of illness). In addition, instruments were employed for both variables in unreported regressions, without measurably affecting the estimated coefficients of the other variables.[8] [9]

The estimated coefficients of the age-sex categorical variables (the head of household is the omitted category) suggest the presence of gender bias in the demand for health care. In the SSC member subsample, the estimated coefficient for a male child (MCHILD) is positive and statistically significant and is more than four times larger in magnitude than the estimated coefficient for either a female child (FCHILD) or the wife (WIFE). The estimated coefficient of other household members (OTHER) is also relatively large in magnitude, although statistically insignificant, presumably because such persons tend to be older and therefore require more care.

The estimated coefficients of the two education variables (illiterate and less than primary completed is the omitted category) suggest that education *of the head of household* must be beyond primary schooling before any effect is registered on the decision to seek health care outside the home. The estimated coefficient of PRIMED, although positive, is numerically very small and statistically insignificant; whereas that of SECED is positive, numerically large and statistically significant.

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[7] The survey also collected data on expenditures. When per capita expenditures are specified in place of per capita income, the number of observations for SSC members declines from 774 to 532 (there are more missing values on total expenditures, which is calculated as the sum of several expenditure categories); and the estimated coefficient remains negative and statistically insignificant (t-statistic = -1.43).

[8] A two-stage procedure was used. In the first stage, the reported values of duration (LENGTH) and intensity (WORKLOST) were regressed on a set of exogenous variables, restricting the sample to those not receiving medical care. The exogenous variables included classificatory variables referring to the reported type of illness, together with the age and sex of the person reported ill and household income per capita. The calculated values from the first stage were used as instruments, in the second stage, to estimate the coefficients of the logit function.

[9] In addition, we tested for the endogeneity of LENGTH and WORKLOST, using a test devised by Hausman (Greene, 1993, 287). This involved regressing both LENGTH and WORKLOST on a set of exogenous variables, including classificatory variables referring to the reported type of illness. The residuals from these regressions were then added to the basic model, with asymptotic z-tests used to test their significance. Since neither variable was statistically significant at even the 0.10 level in either the full sample or the subsample of SSC members (with or without White's corrections to the standard errors), we cannot reject the hypothesis that LENGTH and WORKLOST are exogenous variables in the present model.

The results for the full sample (N=1056) and for SSC non-members (N=282) are broadly consistent with those of SSC members. The main difference occurs with respect to the sign of the estimated coefficient of PRICE, which is *positive* in both the total and SSC non-member samples (it is statistically significant in the non-member sample). This result probably stems from ambiguity with respect to the designation of preferred provider among SSC non-members (the question was not asked of SSC members). Although the questionnaire asked the respondent to identify the provider category "generally used," there was a tendency for respondents to name relatively expensive private and hospital providers. Other differences include the statistical insignificance of SECED and the significance of WIFE and PRIMED in the numerically much smaller (and therefore less stable) SSC non-member sample.

In addition to the results for the basic model reported in ***Exhibit 2-6***, a number of other specifications were tried, the principal results of which are discussed below:

- ▲ Binary variables referring to the six individual quality of care components (e.g., GOODMEDS, BADMEDS) were specified in place of the single QUALITY index. Only one of these (BADMEDS) was consistently significant across specifications, although GOODSTAF was significant in a number of regressions. When the model is reestimated with only BADMEDS substituted for QUALITY, its estimated coefficient in the SSC member subsample is negative (-0.8742) and statistically significant (asymptotic z-statistic = -3.51). None of the other results is much affected by this change in model specification, although the estimated coefficient of PRICE becomes statistically significant (i.e., the asymptotic z-statistic increases from -1.95 to -1.98).[10]

- ▲ We used input data from the facilities survey (see ***Exhibit 1-3***) on 1993 consumption of drugs and supplies per SSC member (in thousands of *sucres*) and on the number of hours worked by doctors (in thousands of hours per year) in each dispensary as direct measures of quality, adding these two variables (DRUGSUPP, DOCHOURS) to the basic model. This modified model was estimated with the subsample of SSC members. The results are reported in ***Exhibit 2-7*** and are used in a series of simulation experiments discussed below. Both DRUGSUPP and DOCHOURS were positively and significantly related to the probability of seeking care. In the presence of these two variables, the estimated coefficient of the quality index (QUALITY) remained positive but statistically insignificant (asymptotic z = 1.22).

- ▲ Binary variables referring to ethnicity and language were added to the basic specification. The ethnic variables are BLACK (1 if black; 0 otherwise) and INDIAN (1 if Indian; 0 otherwise), with the excluded category being "mixed." The language variable is QUECHUA (1 if either Quechua or Quechua/Spanish is spoken; 0 if only Spanish is spoken). Adding these three variables produced some interesting results. First, two of the three additional variables were statistically significant in both the full sample and the SSC member subsample, with BLACK exhibiting a positive sign and QUECHUA exhibiting

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[10] Although the substitution of BADMEDS for QUALITY improved the model's fit and provided more satisfactory results overall, it was not adopted as the basic specification because it was felt that the use of a broader quality of care measure, such as QUALITY, would lead to a more robust model. With 6 individual quality measures it is not surprising that a measure based on one of them would be statistically significant in a given sample. However, it is interesting to note that in qualitative responses provided by those interviewed, the availability of medications was more often mentioned as an important aspect of quality than any other.

a negative sign. These results suggest that the black population is more likely to seek health care when ill, compared to both Indian and mixed ethnic groups, and that those speaking exclusively Spanish are more likely to seek care. The addition of language and ethnic variables also changed the sign on PRICE *in the full sample*, making it negative and statistically significant (it was positive but insignificant in the basic model), and made the estimated coefficient of QUALITY positive and statistically significant in the SSC member subsample (it was positive but only marginally significant in the basic model). None of the other results was qualitatively affected. As noted above, due to the way in which the sample was drawn, ethnicity and language are closely correlated with location, so that these variables may be effectively proxying for unobserved characteristics of the supply environment.

▲ A facility-level variable referring to the proportion of patients seen by the doctor during the preceding year (1993) who were referred (REFER), presumably to an IESS facility located in an urban area, was added to the basic model, with the sample restricted to SSC members.[11] Our expectations were that the variable would have a positive effect on the decision to seek care (since SSC dispensaries serve as gatekeepers for access of SSC members to IESS facilities, dispensaries which refer more often would provide greater expected benefits). However, the estimated coefficient was negative and only marginally significant (asymptotic z= -1.81).

▲ As noted above, the PRICE variable includes expected travel costs, effectively constraining the coefficient of fees and travel costs to be equal.[12] Alternatively, with expected travel costs excluded from the PRICE variable, one of three alternative imputed travel cost measures was added to the basic model: DISTANCE (i.e., for SSC members, distance to the nearest SSC dispensary; for SSC non-members, distance to their preferred provider); TIME (i.e., for SSC members, travel time required to go to the nearest SSC dispensary; for SSC non-members, travel time to their preferred provider); TRAVCOST (i.e., for SSC members, out-of-pocket travel costs to the nearest SSC dispensary; for SSC non-members, travel costs to their preferred provider). For the SSC subsample, only TRAVCOST was even marginally significant (estimated coefficient = -0.1295; asymptotic z-statistic = -1.89). Its inclusion also affected the estimated coefficients of PRICE (reducing its statistical significance) and QUALITY (making it statistically significant). The absence of a strong relationship between the decision to seek care and various measures of physical accessibility is consistent with reasons given by respondents for not seeking care outside the home; "distance too great" was cited as the reason for not seeking care for 11 of the 311 persons (3.5 percent) reported ill who did not seek care.

▲ Variables referring to whether or not an SSC doctor visited the household during the preceding two months (DOCTOR), whether or not the respondent was aware of any SSC

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[11] Data on this variable were obtained from the survey of SSC dispensaries (see Exhibit 1-3). There was also information in the survey referring to whether or not those who sought care were referred; but that variable could not be used since it was only affirmative in the case of those who actually sought care.

[12] This hypothesis could not be rejected at the 0.05 level using a likelihood ratio test (the chi-squared test statistic with one degree of freedom was 0.95). In addition, some initial experimentation was done with an expanded definition of travel costs which included an imputed value for travel time, based on the reported hourly income of the head of household. This expanded definition of travel costs performed less satisfactorily than the more restricted definition limited to reported out-of-pocket travel costs.

health promotional presentations by SSC staff during the previous two months (HEALTHED), and if so, whether the respondent attended (ATTEND) were added to the basic model, with the sample restricted to SSC members. Neither of the variables referring to SSC health promotion sessions, either singly or in combination with the others, was even marginally significant. However, DOCTOR was positively and significantly related to the decision to seek care (the estimated coefficient was 0.9964; asymptotic z-statistic = 5.72). On the face of it, this relationship suggests that doctors are successful in motivating SSC members to use health care. Alternatively, it may signify the existence of a personal relationship between the SSC doctor and some of the households in the sample (which would presumably make them more likely to seek care when ill), or, more likely, the reported visit of an SSC doctor to the home may be a *consequence* of a prior decision to seek care. It is also important to note that the addition of DOCTOR to the basic model affected the magnitude and significance of the estimated coefficient of QUALITY, reducing it from 0.0996 to 0.0523.[13]

2.4   SIMULATIONS

The estimated logit functions can be used to simulate the effect of selected policy changes on the probability of seeking care, and hence, overall levels of utilization. Since we are primarily interested in affecting the behavior of SSC members, we use estimation results for the subsample of SSC members. SSC policy options are effectively limited to changes in the price and perceived quality of the services provided. We use an estimated function (***Exhibit 2-7***) which includes both the out-of-pocket fee paid by SSC members at the time services are received (PRTOT) and the value of drugs and supplies (in thousands of *sucres*) consumed per SSC member in 1993 and the number of hours worked by physicians (DOCHOURS) in the nearest SSC dispensary (DRUGSUPP). This makes it possible to simulate the effects of quality improvements (i.e., improvement in the availability of drugs and supplies, increased availability of physicians) in combination with a policy of recovering the costs of such improvements through a price increase. ***Exhibit 2-8*** shows variation among dispensaries in the out-of-pocket fees SSC members currently pay for health services (in addition to their annual dues), the index of the perceived quality of care provided by the sampled SSC dispensaries, 1993 facility-level consumption per SSC member of drugs and supplies, and number of hours worked by physicians.[14]

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[13] This finding, which implies that QUALITY and DOCTOR are positively correlated, is not too surprising. Where SSC doctors are involved in outreach activities, it would be reasonable for respondents to give the SSC dispensary a higher quality rating.

[14] It is important to recall that no out-of-pocket fees are reported paid by SSC members to SSC dispensaries in most cases. However, when such fees are paid they tend to be relatively large. The practice of selectively charging fees to some members creates price uncertainty and is likely to restrict utilization even more than their average level would suggest.

EXHIBIT 2-7 ESTIMATION RESULTS OF THE LOGIT ANALYSIS OF THE DECISION TO SEEK CARE Estimated Coefficients (asymptotic z-statistics)	
Variable	SSC Members
PRICE	-0.0544 (-1.96)*
QUALITY	0.0755 (1.23)
INCPC	-5.3377 (-0.73)
LENGTH	0.0496 (5.29)*
WORKLOST	0.6016 (2.18)*
MCHILD	0.9101 (3.09)*
FCHILD	0.1044 (0.28)
WIFE	0.0904 (0.35)
OTHER	0.4160 (0.50)
PRIMED	-0.0034 (-0.02)
SECED	1.37 (3.22)*
DRUGSUPP	0.0871 (3.45)*
DOCHOURS	0.8861 (3.26)*
constant	-1.1649 (-1.72)
Pseudo R^2	0.10
N	772

* indicates estimated coefficient is statistically significant at the 0.05 level.

	PRICE (thousands of *sucres*)	QUALITY	DRUGSUPP (thousands of *sucres*)	DOCHOURS (hours per year)
	EXHIBIT 2-8 AVERAGE OUT-OF-POCKET FEES PAID BY SSC MEMBERS AT SSC DISPENSARIES AND SELECTED QUALITY OF CARE MEASURES, BY SSC DISPENSARY (variables defined in text)			
San Pablo 3	8.59	9.33	3.90	1,120
El Aji	0.66	10.13	2.51	746
S. Antonio de Alao	1.65	9.66	3.85	492
Llactahurco	1.79	9.84	5.52	523
Tumbunuma	9.81	8.60	2.32	402
Uzhar	1.85	8.59	4.85	711
Quingue	1.97	10.87	14.33	255
Campanacocha	1.44	10.00	5.37	446
San Vicente 3	18.82	8.43	2.79	832
Means[1]	3.85	9.63	5.73	564

[1]Sample (N=772) is the same as used to estimate the regression reported in **Exhibit 2-7**.

We perform the following simulation experiments:

▲ The average out-of-pocket fee is increased from 3,852 *sucres* to 10,774 *sucres* (an 180 percent increase, but well within the range of observed average prices in **Exhibit 2-8**)[15]

▲ The average consumption of drugs and supplies per SSC dispensary is increased from the sample mean (5,732 *sucres*) to the highest value observed for any dispensary in **Exhibit 2-7** (14,326 *sucres*)

▲ The average out-of-pocket fee for services is increased from the sample mean value sufficiently to pay for the increased consumption of drugs and supplies (i.e., from 3,852 *sucres* to 6,210 *sucres*)[16]

▲ The average number of number of physician hours worked per year in a dispensary is increased from the sample mean of 564 to 1120 (the highest value observed in **Exhibit 2-8**)

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[15] The reason for this particular price increase is explained in the description of the final simulation experiments.

[16] The household survey data were used to obtain an estimate of the annual number of illness episodes per SSC member household for which services are sought at an SSC dispensary (i.e., 3.645). Since the average over the nine sample dispensaries of the number of member households per dispensary is 335, this implies an average of 1,221 illness episodes per year per dispensary. If drug and supply consumption is assumed to increase by 8,594 *sucres* per member household, per our assumptions, the cost of the resulting increase in drug and supply consumption for the average dispensary (i.e., 2,878,990 *sucres*) is equivalent to 2,358 *sucres* per illness episode.

- The average out-of-pocket fee for services is increased from the sample mean value sufficiently to pay for the increased number of physician hours (i.e., from 3,852 *sucres* to 8,416 *sucres*)[17]

- Both average drug consumption and physician hours are increased as above simultaneously

- Both the average consumption of drugs and supplies and the number of physician hours are increased as above, while the average out-of-pocket fee is increased sufficiently to cover the cost of both types of quality improvement (i.e., from 3,852 *sucres* to 10,774 *sucres*; this is the same amount as the price increase in the first simulation).

The results of the above simulation experiments are presented in ***Exhibit 2-9***, together with the arc elasticities evaluated at the sample mean corresponding to the separate price and quality changes. The results show clearly that quality improvements, in the form of increasing the availability of drugs and supplies and hours worked by physicians, can be used to increase levels of utilization by SSC members. If fees are unchanged, such quality improvements would be expected to produce a decrease in net income, since they are estimated to cost an additional 8,452,224 *sucres* while producing additional revenue of only 717,748 *sucres*. However, the simulations also show that quality improvements can be financed fully by raising member copayments while preserving substantial increases in utilization. Additionally, since marginal revenue is now estimated to be higher than marginal cost (i.e., 10,774 *sucres* versus 7,414 *sucres*), the net income of the typical SSC dispensary would also be expected to increase.[18]

It is important to note that the present model does not consider changes in SSC dispensary utilization due to shifts in users from one provider to another in response to the policies simulated. In order to examine the full impact of policy changes on utilization, it is necessary to proceed on to the discrete choice model discussed in the following section.

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[17] The average number of physician hours worked per year per dispensary is assumed to increase by 556.1 hours. The hourly wage paid to physicians at the dispensary with the highest number of physician hours (San Pablo 3) is 10,022 *sucres*, implying that the average cost of this quality improvement per dispensary would be 5,573,234 *sucres*. Again, assuming an average of 1,221 illness episodes per dispensary, full recovery of the cost of this quality improvement would require a price increase of 4,564 *sucres* per episode of illness.

[18] Since SSC dispensaries are assumed to be underutilized prior to the introduction of quality improvements, marginal costs are estimated to be 492 *sucres* initially (i.e., the sample mean consumption per visit of drugs and supplies), but increasing to 7,414 *sucres* following the introduction of the hypothetical quality improvements (i.e., 492 + 2,358 + 4,564 = 7,414).

EXHIBIT 2-9 SIMULATED EFFECTS OF PRICE AND QUALITY CHANGES ON THE PROBABILITY OF SEEKING CARE AMONG RURAL SOCIAL SECURITY MEMBERS		
SIMULATION EXPERIMENT	Simulated Effect	Arc Elasticities
Probability of seeking care evaluated at sample mean values of all the independent variables (i.e., the current situation)	0.806	—
Average out-of-pocket fees are increased from 3,852 to 10,774 *sucres*	0.748	-0.079
Average consumption of drugs and supplies per SSC member household is increased from 5,732 to 14,326 *sucres*	0.892	0.118
Drug consumption is increased as above, while out-of-pocket fees are increased sufficiently to pay for this quality improvement (i.e., from 3,852 to 6,210 *sucres*)	0.879	—
Average physician hours are increased from 564 to 1120 per dispensary per annum	0.866	0.109
Physician hours are increased as above, while out-of-pocket fees are increased sufficiently to pay for this quality improvement (i.e., from 3,852 to 8,416 *sucres*)	0.838	—
Both drug consumption and physician hours are increased simultaneously as above	0.929	—
Both drug consumption and physician hours are increased simultaneously as above, while out-of-pocket fees are increased sufficiently to pay for both quality improvements (i.e, from 3,852 to 10,774 *sucres*)	0.902	—

3.0 CHOICE OF PROVIDER

The previous section discusses a model which predicts the probability of seeking health care away from home when ill. Although this model is relatively simple and helpful in understanding the factors which affect the utilization of SSC dispensaries, it may mask significant shifting between providers as the result of price and quality changes. For example, a ten percent improvement in the quality of care in SSC dispensaries may increase the proportion of those seeking care outside the home when ill by five percent; but it may also shift an additional five percent of users from non-SSC facilities to SSC dispensaries. The second effect (the "substitution" effect) would not be visible with the model discussed in the preceding section, but it would be apparent with the discrete choice model discussed in the present section.

Before proceeding to the multivariate analysis, it is interesting to report what survey respondents gave as reasons for selecting a given provider. 634 SSC members were asked to give advantages and disadvantages of seeking care at the nearest SSC dispensary. The most commonly mentioned advantage was not having to pay (462 respondents), followed by convenience of location (106 respondents), and presence of good staff (46 respondents). Disadvantages cited included: absence of medications (184 respondents), doctors not permanent (110 respondents), and emergency care not available (77 respondents). SSC members were asked whether they were willing to pay for quality improvements (482 of 625 members responded affirmatively) and, if so, which quality improvements they would like to see. The three improvements most often requested were: better availability of medications (185 respondents), longer hours of service (193 respondents), and more and better attention from doctors (49 respondents). When asked how much they would be willing to pay, the most frequently cited amounts were in the range of 800-1,000 *sucres*.

Three hundred eighty-three (383) SSC non-members were asked why they used their preferred provider (literally, the provider they "generally used"). The most common responses were: convenient location (195 respondents), good service (135 respondents), no need to pay (47 respondents), and no alternative available (35 respondents).

3.1   EMPIRICAL MODEL OF CHOICE OF PROVIDER

The choice of provider is modeled as a mixed multinomial logit model—a popular type of discrete choice model—with the choices including the following categories of provider: (1) SSC dispensary; (2) public health center or subcenter; (3) general hospital; (4) private clinic; and (5) home care (the reference category). The log odds of selecting provider j over the reference category is assumed to be a linear function of two sets of relevant explanatory variables ($\mathbf{X}$, $\mathbf{Z}$):

$$\log (PRCH_{ij}/PRCH_{i0}) = \alpha + \lambda \mathbf{X}_{ij} + \beta_j \mathbf{Z}_i \qquad (3\text{-}1)$$

and the log odds of selecting provider j over provider k is assumed to be given by:

$$\log (PRCH_{ij}/PRCH_{ik}) = (\alpha_j + \lambda \mathbf{X}_{ij} + \beta_j \mathbf{Z}_i) / (\alpha_k + \lambda \mathbf{X}_{ik} + \beta_k \mathbf{Z}_i) \qquad (3\text{-}2)$$

where

PRCH is the probability of selecting a given provider (j,k=0, 1,...,4)

α, λ, and β are fixed parameters to be estimated (λ and β are sets of coefficients)

subscript i refers to an individual with a reported illness (or to the household to which the individual belongs)

subscript 0 refers to the reference category of provider, i.e., home-based self-care, traditional care, other unspecified care, or no care[19]

subscripts j and k refer to the four categories of modern providers, i.e., SSC dispensaries (j,k=1), public health centers/subcenters (j,k=2), general hospitals (j,k=3), and private clinics (j,k=4)

X is a vector of provider-varying explanatory variables (sometimes called "conditional" variables), as perceived by household i, whose coefficients do not vary across providers:[20]

PRICE	the expected money price (in thousands of *sucres*) charged by provider j to consumer i
QUALITY	the quality of care of provider j as perceived by consumer i

Z is a vector of individual- or household-varying explanatory variables (sometimes called "unconditional" variables) whose coefficients are assumed to vary across providers:

INCPC	household income per capita (in millions of *sucres*)
SSCMEMB	binary variable indicating whether the household is currently affiliated with SSC (1 if yes, 0 if no)
WORKLOST	binary variable indicating whether the individual lost work due to the reported illness (1 if yes, 0 if no)
LENGTH	length of illness (in days)
WIFE	wife (1 if person reported ill is the head's wife, 0 otherwise)
MCHILD	male child (1 if person reported ill is a male child under 15; 0 otherwise)
FCHILD	female child (1 if person reported ill is a female child under 15; 0 otherwise)
OTHER	other person (1 if person reported ill is other than a child, a male head of household, or the wife; 0 otherwise)
PRIMED	completed primary education (1 if the head of household has completed primary schooling or is literate and has not attended secondary school; 0 otherwise)
SECED	some secondary education (1 if the head of household has some secondary education, 0 otherwise)

Each of these variables is discussed in more detail below:

PRCH. This is a polytomous variable which takes one of five values, i.e., 0, if the person receives care at home, is treated by a traditional healer or by another unspecified provider, or receives no care; 1 if the

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[19] The home/traditional/other care alternative includes the following categories in the estimation sample: treated self (281 cases); traditional practitioner (11 cases); traditional midwife (1 case); other (unspecified) providers (33 cases).

[20] In a mixed multinomial logit model, conditional variables, such as price and quality, vary according to the choice of provider; but their coefficients are assumed not to vary across providers. In contrast, unconditional variables, such as age and household income, do not vary with the choice of provider (they vary with the individual); but their coefficients are assumed to vary across providers. The implied restrictions on the coefficients of the conditional variables (i.e., that they are equal across providers) are tested statistically below.

person is treated at an SSC dispensary; 2 if the person is treated at a public health center or subcenter; 3 if the person is treated at a general hospital; and 4 if the person is treated at a private clinic.

PRICE. This variable consists of imputed values of the expected out-of-pocket costs (in thousands of *sucres*) to consumer i, including imputed travel costs, of obtaining health care from a given provider. The values are obtained by regressing the reported combined fee paid for visits, medications, and travel costs on the following variables: type of provider (interacted with location of residence and with SSC affiliation [SSC dispensaries only]), and household income per capita. Again, SSC affiliation is directly reflected in the expected PRICE measure, so that a major impact of SSC affiliation on the choice of provider should operate through the PRICE variable (see discussion of SSCMEMB below). Since the theoretical variable is expected price, imputed values are used for all observations (i.e., actual expenditures are not used even in cases where they are reported).

QUALITY. This variable is an index of the perceived quality of care at each facility and is based on subjective ratings provided by respondents of their preferred provider (assumed to be the nearest SSC dispensary in the case of SSC providers) according to: (1) waiting time (WAIT); (2) staff qualifications (STAFF); (3) quality of treatment received (CARE); (4) availability of medications (MEDS); (5) availability of medical equipment (EQUIP); and (6) convenience of hours (HOURS). A rating of "good" on a given quality dimension receives a score of 2, "normal" receives 1, and "bad" receives 0. Accordingly, the quality index ranges between 0 and 12. Reported quality assessments are used for SSC dispensaries (for SSC-affiliated households) and for the preferred provider (SSC non-affiliated households); otherwise quality ratings are imputed, based on the means for category of provider and location of residence. In addition to the QUALITY index, reported (or similarly imputed) assessments of individual components of the quality index are also used in some regressions (e.g., GOODMEDS, BADMEDS), i.e., categorical variables equal to one if the respondent characterizes drug availability as "good" or "bad," and zero otherwise.

INCPC. Annual reported household income per capita (in millions of *sucres*). It is expected that income is positively related to the choice of relatively expensive (and presumably higher quality) providers, such as hospitals and private clinics.

SSCMEMB. This binary variable indicates whether the household is affiliated with the SSC. SSC affiliation is expected to affect the choice of provider in several ways. Its most important effect may operate through decreasing the out-of-pocket PRICE the household expects to pay for health care (i.e., the insurance effect, or "moral hazard"). In addition to the price effect, the use of an SSC facility by an SSC affiliate may reflect the desire to have zero-cost access to the IESS referral network, as well as access to patient records from prior use of the facility. Additionally, it may reflect the health education activities of SSC staff. We therefore expect a positive effect of SSC affiliation on the probability of SSC dispensary use, even with PRICE held constant.

LENGTH. This variable is the reported length of illness in days. This variable may be endogenous, since the choice of provider may affect the duration of illness. Accordingly, an instrument was used in place of LENGTH in some regressions.

WORKLOST. This binary variable indicates whether the household member has missed work as the result of the reported illness. It is a measure of the severity of the reported illness (i.e., a measure of health

status), which may affect the choice of provider (e.g, a hospital over a dispensary). This variable may also be endogenous, since the severity of illness may also be affected by the choice of provider. Accordingly, instruments are used in some regressions.

WIFE. This binary variable indicates whether the household member reported to have been ill is the wife of the head of household.

MCHILD. This binary variable indicates whether the household member reported to have been ill is a male child under 15 (1 if yes, 0 if no).

FCHILD. This binary variable indicates whether the household member reported to have been ill is a female child under 15 (1 if yes, 0 if no).

OTHER. This binary variable indicates whether the household member who is reported to have been ill is other than a child, the mother or a male head of household (1 if yes, 0 if no). Although age is not given, it is suspected that such other household members are predominantly older relatives of the head of household (the excluded category is the head of household).

PRIMED. This binary variable indicates whether the head of household has completed primary schooling, or is literate, but has not attended secondary school (1 if yes; 0 if no).[21]

SECED. This binary variable indicates whether the head of household has received some secondary education (1 if yes; 0 if no).

Means and standard deviations of the variables in the estimation sample are presented in *Exhibit 3-1*. The estimation sample is smaller than the full sample due to missing data on one or more variables for a given observation.

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[21] It would be preferable to specify the education of the person reported to have been ill (or the mother's education, in the case of children), rather than that of the head of household; but the survey only provided education data for the head of household.

EXHIBIT 3-1 MEANS AND STANDARD DEVIATIONS OF THE VARIABLES USED IN THE ANALYSIS OF THE CHOICE OF PROVIDER (N = 1177)			
VARIABLE NAME		Mean	Standard Deviation
Proportion seeking care at:			
SSC dispensary	PRCHSSC	0.466	0.499
Public health center/subcenter	PRCHCENT	0.091	0.288
General hospital	PRCHHOSP	0.067	0.250
Private clinic	PRCHPRIV	0.095	0.294
Home care/other	PRCHOTH	0.281	0.450
Expected price of health care (thousands of sucres*) at:*			
SSC dispensary	PSSC	7.49	11.88
Public health center/subcenter	PCENT	13.93	7.90
General hospital	PHOSP	24.44	11.79
Private clinic	PPRIV	39.10	12.48
Home care/other	POTH	5.11	6.39
Perceived quality of health care at:			
SSC dispensary	QSSC	9.53	0.809
Public health center/subcenter	QCENT	9.93	0.795
General hospital	QHOSP	10.35	0.608
Private clinic	QPRIV	10.22	0.524
Home care/other	QOTH	10.00	0.000
Household income per capita (millions of *sucres*)	INCPC	0.027	0.027
Duration of illness (days)	LENGTH	15.46	10.31
Whether work lost due to illness (1 if yes)	WORKLOST	0.382	0.486
Whether male child under 15 (1 if yes)	MCHILD	0.202	0.402
Whether female child under 15 (1 if yes)	FCHILD	0.175	0.380
Whether wife of head of household (1 if yes)	WIFE	0.319	0.466
Whether other family member (1 if yes)	OTHER	0.042	0.202
Whether head of household has completed primary education (1 if yes)	PRIMED	0.427	0.495
Whether head of household has completed some secondary education (1 if yes)	SECED	0.129	0.335
Whether household is currently affiliated with SSC (1 if yes)	SSCMEMB	0.709	0.455

3.2 ESTIMATION RESULTS

The model presented in ***Equations 3-1 and 3-2*** was estimated by the technique of maximum likelihood estimation (MLE). The estimation results, with the home treatment alternative as the base category, are presented in ***Exhibit 3-2***.[22] The results are broadly consistent with a priori expectations, as well as with those obtained with the logit analysis discussed in the preceding section. The estimated coefficients of the conditional variables referring to price and perceived quality of care have the expected signs, and both are statistically significant. Consistent with the specification of the mixed multinomial logit function, price and quality each have only one coefficient; there are no direct cross-equation price and quality effects.[23] Again, much of the estimated effect of SSC membership is reflected in the estimated coefficient of PRICE. In addition, the estimated coefficient of SSCMEMB, an unconditional variable, is also statistically significant in all equations. It has a statistically significant positive effect on the choice of an SSC provider and has a significant negative effect on the probability of selecting all other providers. The effects of changes in PRICE, QUALITY and SSCMEMB are simulated and discussed in the following subsection.

The estimated coefficients of a number of the other unconditional variables are also interesting and require some comment. INCPC is statistically significant only for SSC providers; and its negative sign implies that higher income consumers are less likely to select an SSC provider, as compared to other providers (including the home care alternative). These results are different from those obtained with the logit function, where income was insignificant as a determinant of the decision to seek care away from home. The results obtained here suggest that individuals from higher income households may make greater use of non-SSC providers when ill.

As expected, LENGTH (duration of illness) and WORKLOST (severity of illness) significantly increase the probability of seeking care from any modern provider, as compared to the home care alternative. These results are consistent with those obtained in the preceding section with the logit analysis of the decision to seek care.

The age and sex variables present a somewhat different picture from that which emerged from the logit analysis. There is no indication of sex bias in either the decision to seek care or in the choice of provider. Both male and female children (MCHILD, FCHILD), together with other household members (OTHER), are more likely to be treated at either an SSC dispensary or at an MOH health center or subcenter. None of the other age and sex variables is statistically significant.

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[22] The estimated standard errors, on which the asymptotic z-statistics in Exhibit 3-2 are based, have not been adjusted for the effects of cluster sampling in the discrete choice model. This affects only the statistical significance of the results. It has no effect on either the estimated coefficients or on the results of the simulations discussed below.

[23] These constraints were tested by performing a likelihood ratio test (Theil, 1971, 396-397). The hypothesis that the constraints were valid was rejected at the 0.05 level of significance (the chi-square statistic, with 30 degrees of freedom, was 203.8). However, the unconstrained model was considered to have too many parameters for the data set, given that both the QUALITY variable (and to a large extent the PRICE variable) was imputed on the basis of only nine distinct cluster-specific means. An unconstrained version of the model was estimated, however; and some simulations were done with it, as reported below.

	EXHIBIT 3-2			
	ESTIMATION RESULTS FOR MIXED MULTINOMIAL LOGIT MODEL OF THE CHOICE OF PROVIDER			
	Estimated Coefficients (asymptotic z-statistics)			
CONDITIONAL VARIABLES				
PRICE	-0.0241 (-4.21)*			
QUALITY	0.2598 (3.87)*			
Unconditional Variables	SSC Dispensary	Health Center	General Hospital	Private Clinic
INCPC	-7.4565 (-2.02)*	0.6705 (0.16)	-3.9257 (-0.74)	3.5522 (1.13)
LENGTH	0.0350 (4.51)*	0.0497 (4.23)*	0.0739 (5.54)*	0.0538 (4.77)*
WORKLOST	0.9714 (5.52)*	0.4872 (1.86)	1.2371 (4.45)*	0.8060 (3.29)*
MCHILD	0.7760 (3.25)*	1.4759 (3.93)*	0.2091 (0.48)	0.6448 (1.88)
FCHILD	0.6531 (2.68)*	1.3300 (3.41)*	0.4766 (1.15)	0.2165 (0.56)
WIFE	0.2955 (1.45)	0.6995 (1.97)*	0.3830 (1.20)	0.3880 (1.36)
OTHER	1.1140 (2.41)*	1.6914 (2.77)*	-0.1445 (-0.17)	1.1164 (1.93)
PRIMED	0.2033 (0.12)	0.5705 (2.27)*	0.2471 (0.86)	0.3694 (1.49)
SECED	0.0775 (0.31)	-0.0762 (-0.19)	0.2367 (0.59)	0.5277 (1.62)
SSCMEMB	1.8629 (8.41)*	-0.8146 (-3.40)*	-1.1481 (-4.15)*	-0.7717 (-3.33)*
constant	-4.3983 (-5.94)*	-4.9394 (-6.132)*	-4.8439 (-5.63)*	-4.0893 (-4.94)*
Pseudo R^2	0.15			
N	1177			
* indicates estimated coefficient is statistically significant at the 0.05 level.				

Most of the estimated coefficients referring to the two education variables (which refer to the head of household) are positive, but statistically insignificant. The exception is PRIMED (primary education completed or literate) which is positively and significantly related to the likelihood of selecting a public health center/subcenter, and SECED (some secondary education), which is negatively (but not significantly) related to the likelihood of selecting a public health center/subcenter.

Some variants of the basic model were also estimated:

▲   The basic model was re-estimated for the SSC member subsample. The results were quite similar to those obtained with the full sample. The estimated PRICE coefficient was only slightly different (-0.0203 versus -0.0241); whereas the estimated coefficient of

QUALITY increased in magnitude, from 0.2598 with the full sample, to 0.3911, for SSC members. The only other significant change was that the estimated coefficient of income (INCPC) decreased by about 50 percent, becoming insignificant. Apparently, the negative relationship between income and the probability of selecting an SSC dispensary as provider is considerably stronger among SSC non-members.

▲ BADMEDS was substituted for QUALITY, as was done above with the model of the decision to seek care. The estimated coefficient of BADMEDS was negative and statistically significant, as expected. The estimated coefficient of PRICE was not appreciably affected, nor were any of the estimated coefficients of the unconditional variables.

▲ The distance of each provider from the household's place of residence (DISTANCE) was specified in place out-of-pocket travel costs (which were temporarily removed from the price variables for this purpose), with its coefficient constrained to be equal across equations (i.e., DISTANCE was treated as a "conditional" variable). DISTANCE was significantly negatively related to the probability of selecting a given provider (asymptotic z-statistic = -5.13).[24] With the exception of the QUALITY variable, the coefficient of which increased in magnitude (from 0.2598 to 0. 3455), the other coefficients were not appreciably affected by this modification.

3.3   SIMULATIONS

The technique of simulation is once again employed to examine how the choice of provider would be affected by changes in selected policy variables which could in principle be altered by SSC. The policies simulated include:

▲ The expected out-of-pocket cost of SSC services (including medications) was decreased from 7,490 (the sample mean for both SSC members and non-members) to 4,530 *sucres*

▲ The perceived quality of care index for SSC dispensaries is increased from 9.53 (the sample mean) to 10.87 (the highest level observed among the nine sample dispensaries)

▲ The proportion of the sample who are SSC members is increased from 0.716 (the sample mean) to 0.80 (within the sampled areas, the proportion of the population affiliated with SSC varies from 0.51 to 0.91).

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[24] The values of DISTANCE were imputed for providers other than the household's preferred provider.

The results of the policy simulations are presented in *Exhibit 3-3*; and the corresponding arc elasticities evaluated at the sample means are presented in *Exhibit 3-4*.[25][26] The simulated price decrease increases the probability of selecting an SSC provider from 0.42 to 0.44, a relatively small change.[27] In contrast, the simulated quality improvement increases the probability from 0.42 to 0.51, while the simulated increase in SSC membership raises it from 0.42 to 0.47. These results suggest that improvements in the quality of care and in the proportion of the population affiliated with SSC offer the most potential for increasing the utilization of SSC dispensaries.

EXHIBIT 3-3 SIMULATED EFFECTS OF CHANGES IN PRICE, QUALITY OF CARE AND SSC MEMBERSHIP ON THE CHOICE OF PROVIDER					
SIMULATION EXPERIMENT	Simulated Effect on the Probability of Selecting a Provider				
	SSC	Health Center	Hospital	Private Clinic	Home Care
Probabilities at mean values of the independent variables (i.e., the current situation)	0.424	0.093	0.068	0.102	0.314
Price of SSC services decreased from 7,490 to 4,530 *sucres*	0.440	0.090	0.066	0.099	0.305
Quality of care index of SSC services increased from 9.53 to 10.87	0.506	0.079	0.058	0.087	0.271
SSC membership from 0.716 of sample to 0.80	0.469	0.082	0.059	0.091	0.300

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[25] The same simulation experiments were done using a model with SSCMEMB deleted, which was estimated with the subsample of SSC members. The predicted probability of selecting an SSC provider increased from 0.600 (the sample mean) to 0.614, as the result of the simulated price decrease (arc elasticity = -0.019), and from 0.600 to 0.710, as the result of the simulated quality improvement (arc elasticity = 1.320). Within the SSC member subsample, therefore, the simulated effect of price changes is even weaker than with the full sample; whereas the simulated effect of quality improvements is stronger.

[26] Another set of simulations was done using the same assumptions as those given in the text, but using the version of the model without any constraints imposed on the various price and quality coefficients (i.e., an ordinary multinomial logit model, instead of the mixed multinomial logit model). The results were qualitatively similar. However, the effects of price and quality changes were considerably magnified (the probability of seeking care at an SSC dispensary increased by 0.089 and 0.197 respectively), due to the fact that the unconstrained price and quality coefficients were larger in magnitude for SSC dispensaries than for other categories of providers; and the effects of changes in the proportion of the population affiliated with SSC were considerably smaller (the probability of seeking care at an SSC dispensary increased by only 0.037). As noted above, there is reason to believe that the unconstrained model is unstable, as it contains 32 coefficients of variables imputed largely on the basis of only nine cluster means (the constrained model has only two).

[27] One reason for the relatively small impact of the simulated price change is the fact that out-of-pocket fees charged to SSC members when using SSC facilities are relatively low (refer back to Exhibit 2-3) and the simulated changes, though large in percentage terms, are absolutely quite small.

	SSC Dispensary	Health Center	General Hospital	Private Clinic	Home Treatment
EXHIBIT 3-4 ARC ELASTICITIES EVALUATED AT THE SAMPLE MEAN					
PRICE	-0.079	0.062	0.064	0.061	0.058
QUALITY	1.355	-1.237	-1.261	-1.196	-1.137
SSCMEMB	0.914	-1.075	-1.325	-1.013	-0.432

4.0 SSC AFFILIATION

The results of the preceding sections have shown that SSC affiliation is a strong determinant of both the decision to seek health care away from home and the choice of an SSC provider. In this section we specify and estimate a model of the decision to affiliate with the SSC.

The survey provides some qualitative information bearing on the decision to affiliate with SSC. Of the 383 sampled households who were not affiliated with SSC at the time of the survey, 88 reported having been previously affiliated with SSC. When asked why they had left SSC, the most common responses given were lack of money (34 respondents) and poor quality of care (29 respondents). Nevertheless, more than half (66 percent) indicated that they would like to rejoin SSC. When asked why, one of the following three responses was most often given: convenient location (17 respondents), good care (14 respondents), and low cost (11 respondents). When former affiliates were asked what type of changes they would most like to see before rejoining SSC, the most common responses were: increased services/emergency care (28 respondents), and better drug availability/free drugs (17 respondents).

Of the 295 respondents from households which were neither currently nor previously affiliated with SSC, 193 (65 percent) indicated that they had previously considered the possibility of joining SSC. Those who indicated that they had not previously considered joining offered the following explanations: lack of information about SSC (25 respondents); heard SSC was good (22 respondents); use other providers (12 respondents); and lack of money (9 respondents). When those who had considered joining were asked why they had not previously joined, the most common reasons cited were: lack of interest (63 respondents); lack of information (40 respondents); failure to attend promotional meetings (39 respondents), distance too great (17 respondents); and poor care (19 respondents). When asked what changes they would like to see made before joining, the most commonly given responses were: more attention (time) received from medical personnel (54 respondents); more drugs available (34 respondents), and better service in general (39 respondents).

4.1   EMPIRICAL MODEL OF SSC AFFILIATION

The decision to affiliate with the SSC is modeled as a logit analysis, with the log odds of being an SSC member assumed to be a linear function of a set of relevant explanatory variables (**X**):

$$\log [PRA_i/(1-PRA_i)] = \alpha + \beta \mathbf{X}_i \qquad (4\text{-}1)$$

where

PRA is the probability of being affiliated with SSC

α and β are fixed parameters to be estimated (β is a set of parameters)

the subscript i refers to a household

X is a set of explanatory variables, including:

DUES	expected annual cost of SSC membership (in thousands of *sucres*)
PDIFF	expected difference in the out-of-pocket costs of health care per episode of illness (including drugs and travel costs, in thousands of *sucres*) between SSC members and non-members
QDIFF	difference in the index of the perceived quality of health care between SSC facilities and preferred non-SSC facilities
REFER	proportion of consultations at each SSC dispensary which involve referrals.
INCPC	reported household income per capita (in millions of *sucres*)
HSIZE	household size
PAGE	proportion of household members who are children under 15 or adults over age 50
PMALE	proportion of household members who are male
OCCUP	binary variable indicating whether the head of household is in an occupation with relatively high rates of SSC affiliation (i.e., agriculture)
PRIMED	completed primary education (1 if the head of household has completed primary education or is literate but has not attended secondary school; 0 otherwise)
SECED	some secondary education (1 if the head of household has some secondary education, 0 otherwise)

Each of these variables is discussed in greater detail below:

PRA. This is a dichotomous dependent variable, indicating whether the household is currently affiliated with the SSC (1 if yes, 0 if no).

DUES. This variable represents the expected annual cost (i.e., dues) of SSC membership to a household. It is imputed from regressions of dues reported paid by SSC members on categorical variables referring to the location of residence and household size (surprisingly, larger households appear to pay significantly lower dues). Imputed values are used for all households. Since DUES is effectively the price of SSC membership, we expect it to be negatively related to the probability of affiliation with SSC.

PDIFF. This variable is the differential in expected out-of-pocket costs of health care per episode of illness (in thousands of *sucres*) between SSC members (PRSSC) and non-members (PRNSSC), i.e., PDIFF = PRSSC - PRNSSC. PDIFF is based on imputed values of expected out-of-pocket costs of health care for SSC affiliates (PRSSC) and non-SSC affiliates derived from regressions of actual fees paid for visits and medications, together with travel costs, at all types of facilities as a function of location of residence (interacted with a binary variable indicating whether the person's household is affiliated with SSC), household income per capita, type and severity of illness, and the age and sex of the person reported ill. Since PDIFF is effectively a relative price, we expect it to be negatively related to the probability of SSC affiliation.

QDIFF. This variable is the difference in the perceived quality of care between SSC facilities (QSSC) and non-SSC facilities (QNSSC), i.e., QDIFF = QSSC - QNSSC. This variable is based on imputed values of perceived quality obtained from regressions of quality ratings provided by SSC members of the services provided at the nearest SSC facility and, in the case of SSC non-members, at their preferred provider. The quality ratings address: (1) waiting time (WAIT); (2) staff qualifications (STAFF); (3) quality of treatment received (CARE); (4) availability of medications (MEDS); (5) availability of medical equipment (EQUIP); and (6) convenience of hours (HOURS). A rating of "good" on a given quality dimension receives a score of 2, "normal" receives 1, and "bad" receives 0. Accordingly, the quality index

ranges between 0 and 12. Since QDIFF measures the expected gain in quality of care associated with SSC membership, we expect it to be positively related to the probability of SSC membership.

REFER. This variable is the proportion of each SSC dispensary's 1993 consultations which involved a referral. It is derived from service statistics for each of the nine SSC dispensaries included in the sample. Since one motive for affiliating with SSC may be to secure access to IESS facilities on referral, we expect this variable to be positively related to the probability of SSC affiliation.

INCPC. Reported annual household income per capita (in millions of *sucres*). INCPC should be positively related to the demand for relatively expensive, high-quality care. Since SSC care is targeted more to providing basic primary care to lower-income families, it is expected that INCPC is negatively related to the probability of affiliating with SSC.

HSIZE. Household size. One would expect the decision to affiliate with SSC to be positively related to household size, since net benefits from affiliation should increase more or less proportionately with household size.[28]

PAGE. This variable measures the proportion of household members who are children under 15 years of age or adults 50 years of age and older. Since these two age groups have relatively high demand for health care, one would expect this variable to be positively related to the decision to affiliate with SSC.

PMALE. This variable measures the proportion of household members who are male. It reflects the possibility that the household's demand for health may be related to its gender composition. We expect that the probability of SSC affiliation is positively related to PMALE.

OCCUP. Agricultural workers exhibit higher rates of SSC affiliation than do other types of worker. This binary variable indicates whether the head of household is employed in agriculture (1 if yes, 0 if no), and it is expected to be positively related to SSC affiliation.

PRIMED, SECED. These two binary variables indicate whether the head of household has completed primary schooling or is literate but has not attended any secondary schooling (PRIMED) or that the head of household has some secondary schooling (SECED). The excluded category is that the head of household has not completed primary school and is illiterate. PRIMED and SECED are included to reflect a likely positive relationship of education to the demand for health. Alternatively, more educated heads of household may prefer to exercise greater freedom of choice in providers than SSC membership would encourage.

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[28] The tendency for net benefits from SSC affiliation to increase with household size should be even stronger, given the finding alluded to above that the level of DUES paid is negatively related to household size.

The means and standard deviations of the variables in the estimation sample are provided in *Exhibit 4-1*.

EXHIBIT 4-1 MEANS AND STANDARD DEVIATIONS OF THE VARIABLES USED IN THE LOGIT ANALYSIS OF THE DECISION TO AFFILIATE WITH SSC (N = 1187)			
VARIABLE		Means	Standard Deviation
Whether currently a member of SSC	PRA	0.706	0.456
Expected annual SSC dues (thousands of *sucres*)	DUES	14.572	7.259
Differential in expected out-of-pocket costs (thousands of *sucres*)	PDIFF	-9.472	8.804
Perceived quality differential	QDIFF	-0.386	0.805
Proportion of SSC consultations referred	REFER	0.051	0.019
Per capita household income (millions of *sucres*)	INCPC	0.027	0.029
Household size	HSIZE	6.118	2.806
Proportion of household under 5 or over 50	PAGE	0.356	0.246
Proportion of household members male	PMALE	0.505	0.177
Head of household working in agriculture	OCCUP	0.696	0.460
Head completed primary education	PRIMED	0.425	0.495
Head has some secondary education	SECED	0.130	0.336

4.2   ESTIMATION RESULTS

The results of maximum likelihood estimation of *Equation 4-1* are provided in *Exhibit 4-2*.[29] Neither of the price variables (DUES, PDIFF) is statistically significant; contrary to expectations, both of the estimated coefficients exhibit positive signs. The fact that the positive estimated coefficient of PDIFF is marginally significant (asymptotic $z = 1.24$) is particularly surprising since the benefits derived from SSC membership should be directly related to the expected *reduction* in the out-of-pocket costs of health care. Since obtaining unexpected results is sometimes interpreted as evidence that the model may be misspecified, these results suggest that the other results obtained with this model should be interpreted with caution.

The positive and statistically significant coefficient of QDIFF (asymptotic $z = 5.60$) suggests that SSC membership can be expanded by improving the perceived quality of care at SSC facilities (see discussion below of the impact of simulated changes in the quality of care). The proportion of consultations involving referrals (REFER) is also positively and significantly related to the probability

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[29] Due to the fact that cluster sampling was employed, the estimated standard errors are again adjusted using White's procedure (Greene, 1993, 391).

of SSC affiliation (asymptotic z = 3.14), suggesting that the referral rate can also be used as a policy instrument to increase SSC membership (see simulation experiments below).

The finding that per capita income is negatively and significantly related to the probability of SSC affiliation (asymptotic z = -5.14), even with education and occupation held constant, is interesting and consistent with earlier findings (section three) that the likelihood of selecting an SSC provider is inversely related to income. Apparently, SSC membership appeals to relatively low-income households, perhaps because it offers relatively inexpensive, low-quality care. The results also confirm that agricultural workers (OCCUP) are significantly more likely to be affiliated with SSC, even with income held constant. None of the other estimated coefficients is statistically significant.

In addition to the results reported in ***Exhibit 4-2*** for the basic model, the following results were obtained by making some minor modifications to the basic model:

- As in section 2, three binary variables referring to ethnic affiliation (INDIAN, BLACK) and language spoken (QUECHUA) were added to the basic model. Of these additional variables, only the estimated coefficient of BLACK was statistically significant (negative), suggesting that the ethnic black population is significantly less likely to be affiliated with the SSC. However, as is shown in ***Exhibit 1-2***, most of the black population in the sample is found in only one of the sampled areas; so that this result may instead reflect some unobserved aspect of the supply environment. The addition of the ethnic/language variables does affect certain other results. In particular, the estimated positive coefficients of DUES and PDIFF (which were expected to be negative) increase in magnitude and become statistically significant.

- Distance to the nearest SSC dispensary (DISTSSC) and out-of-pocket travel costs (TCSST) to the nearest SSC dispensary were added separately to the basic model. It was expected that both variables would be negatively related to the decision to affiliate with the SSC. However, both estimated coefficients were positive (that of TCSST was also statistically significant). These results are puzzling and provide additional evidence suggesting that the model may be misspecified.

EXHIBIT 4-2 RESULTS OF LOGIT ANALYSIS OF THE DECISION TO AFFILIATE WITH SSC (Dependent variable: PRA)		
EXPLANATORY VARIABLE		Estimated Coefficient (asymptotic z-statistic)
Expected annual SSC dues	DUES	0.0053 (0.24)
Expected price differential	PDIFF	0.0145 (1.24)
Perceived quality differential	QDIFF	0.5316 (5.60)[*]
Proportion of SSC consultations involving referrals	REFER	29.7313 (3.14)[*]
Per capita household income	INCPC	-17.4974 (-5.14)[*]
Household size	HSIZE	0.0137 (0.26)
Proportion of household under 5 or over 50	PAGE	-0.6121 (-0.99)
Proportion of household members male	PMALE	-0.0439 (-0.07)
Head of household working in agriculture	OCCUP	0.5817 (2.39)[*]
Head completed primary education	PRIMED	0.1382 (0.62)
Head has some secondary education	SECED	-0.2644 (-0.81)
constant		-0.0652 (-0.09)
Pseudo R^2		0.10
N		1,187
[*] indicates estimated coefficient is statistically significant at the 0.05 level.		

4.3 SIMULATIONS

Exhibit 4-3 presents mean values of DUES, PDIFF, QDIFF, and REFER for each of the nine dispensaries surveyed.

EXHIBIT 4-3 SSC DUES, OUT-OF-POCKET COST (PDIFF) AND QUALITY (QDIFF) DIFFERENTIALS AND REFERRAL RATES, BY SSC DISPENSARY				
	DUES (*sucres*)	PDIFF (*sucres*)	QDIFF	REFER
San Pablo 3	13,995	-3,000	-0.935	0.080
El Aji	25,471	-32,030	0.341	0.016
S. Antonio de Alao	9,894	-5,890	-0.911	0.075
Llactahurco	5,752	-4,340	0.388	0.046
Tumbunuma	9,592	1,310	-0.599	0.064
Uzhar	16,892	-7,250	-1.713	0.055
Quingue	24,786	-8,310	0.489	0.035
Campanacocha	6,019	-15,100	-0.085	0.045
San Vicente 3	15,020	-22,890	0.433	0.031
Totals	13,047	-9,176	-0.389	0.051

The following policy simulations are performed with the estimated logit function reported in *Exhibit 4-2*:

▲   the differential in the perceived quality of care between SSC and preferred non-SSC facilities (QDIFF) is increased from -0.389 (the sample mean) to +0.815 (corresponding to an increase in the perceived quality of care index for SSC dispensaries from its sample mean value of 9.67 to 10.87, the highest value actually observed in the sample)

▲   the proportion of consultations involving referrals at the nearest SSC dispensary is increased from the sample mean of 0.051 to the highest value observed in the sample, i.e., 0.08 at the San Pablo 3 dispensary.

The simulation experiments are carried out at the sample means of the other explanatory variables. Although the sample is weighted heavily toward SSC members, the most relevant comparison for simulation purposes is to areas in which there is an SSC dispensary.[30] The results of these simulations, along with corresponding arc elasticities evaluated at the sample mean, are reported in *Exhibit 4-4*. These results suggest that increases in the quality of care and in the referral rate at SSC dispensaries are both effective measures to increase the proportion of the population affiliated with the SSC.

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[30] In late 1993, the SSC program had 822,809 participants, compared to an estimated total rural population of 4,472,000 persons (SEDATOS, 1994; Population Reference Bureau, 1994), suggesting that the overall probability of SSC affiliation is approximately 0.184 (compared to the sample proportion of 0.706). However, the sample proportion in this case is fairly close to the mean proportion of the population affiliated (0.653) in the nine service areas covered by the survey (SEDATOS, 1994).

	Simulated Effect	Arc Elasticities
EXHIBIT 4-4 **SIMULATED EFFECTS OF INCREASED QUALITY OF CARE DIFFERENTIAL** **AND INCREASED REFERRAL RATE, TOGETHER WITH** **CORRESPONDING ARC ELASTICITIES**		
Probability of SSC affiliation evaluated at the sample mean of the explanatory variables	0.716	—
Simulated effect of increasing the perceived quality of care differential between SSC and non-SSC services from -0.389 to +0.815	0.807	0.939[1]
Simulated effect of increasing the proportion of consultations involving a referral from 0.051 to 0.080	0.837	0.352
[1] Arc elasticity calculated in relation to the percentage change in the SSC quality of care index, instead of with respect to QDIFF (because of the sign change).		

The results of sections three (choice of provider) and four (decision to affiliate with SSC) can be combined to obtain estimates of the total impact of quality changes on the utilization of SSC dispensaries. For example, as reported in section three, bringing the average level of perceived quality of care among the sample SSC dispensaries (9.53) up to the level of the best among them (10.87) was associated in simulations with a direct increase in the probability of selecting an SSC dispensary for treatment when ill from 0.424 to 0.506 (19.3 percent) in the full sample (the simulated increase was from 0.600 to 0.710 in the subsample of SSC members). The same quality improvement could be expected to increase the proportion of the population affiliated with SSC from the sample mean of 0.716 to 0.807 (12.7 percent), which in turn would be associated with a further increase in the probability of selecting an SSC dispensary of 0.056 (13.3 percent) to 0.562.[31] In other words, a 14.1 percent improvement in the perceived quality of care would be associated with an estimated 32.6 percent overall increase in utilization and revenues.

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[31] This last estimate reflects both the direct effect of SSC membership on the choice of provider, which increases the probability of selecting an SSC dispensary from 0.506 to 0.557, as well as the indirect effect of expanded SSC membership on the expected out-of-pocket fees paid for health care (i.e., the insurance effect, which corresponds to a decrease from 7.49 to 6.65 thousand *sucres* in the expected price), which further increases the probability of selecting an SSC dispensary from 0.557 to 0.562.

Furthermore, we estimate the cost of such quality improvements to be approximately 2,369 *sucres* per episode of illness.[32] If fees remain unchanged, however, net income would be expected to decrease in this case, since the cost of the hypothetical quality improvement (2,892,390 *sucres*) would exceed the expected revenue gains (2,149,673 *sucres*).[33] However, since the price elasticity of demand for out-of-pocket fees charged to SSC members was estimated to be only -0.079, increasing fees to cover the full cost of such quality improvements (i.e., increasing fees from the sample mean average of 3,852 to 6,221 *sucres*, or 61.5 percent) would decrease the probability of selecting an SSC dispensary for care by only about 5 percent. Again, since average revenue of 6,221 *sucres* is well in excess of marginal costs (i.e., 492 + 2,364, or about 2,861 *sucres* in this case), quality improvements financed through user fees should also increase the typical SSC dispensary's net income.

Increasing the referral rate from its sample mean of 5.1 percent to 8 percent (the highest observed value among the sample dispensaries) would increase facility membership by an estimated 17 percent and facility revenue by an estimated 1,618,364 *sucres*; but such a policy would increase facility costs by more (2,840,390 *sucres*), thereby worsening the typical facility's net income.[34] If out-of-pocket fees to members were increased sufficiently to cover the estimated shortfall (i.e., from the sample mean fee of 3,852 to 4,853 *sucres* per episode), overall levels of utilization would still increase by an estimated 15 percent (again, using the estimated price elasticity of -0.079).

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[32] A regression of the perceived quality of care index (QUALITY) on drug and supply consumption per SSC member household (in thousands of *sucres*), using the subsample of SSC members, yields an estimated coefficient of 0.1552 (t-statistic=6.53), implying that drug and supply consumption per SSC member household would have to increase by 8,634 *sucres* in order to increase perceived quality of care from the sample mean value of 9.53 to 10.87 (an increase of 1.34), or an average of 2,892,390 *sucres* per dispensary (based on the sample mean of 335 member households per dispensary). Since an average dispensary treats 1,221 episodes of illness in a given year (based on a sample mean of 3.64 episodes of illness treated at SSC dispensaries per member per year), the hypothetical quality improvement would cost an estimated 2,369 *sucres* per episode of illness.

[33] Revenue from user fees would be expected to increase by 1,529,244 *sucres* (i.e., an additional 397 illness episodes treated at 3,852 *sucres* per episode), while revenue from membership dues would be expected to increase by 620,429 *sucres* (i.e., an increase of 42.6 members at 14,572 *sucres* in dues per member).

[34] Assuming the sample mean number of member households per SSC dispensary (335), the hypothetical increase in the referral rate would add an estimated 56.6 additional member households. Assuming the sample mean annual dues paid per household of 14,572 *sucres* (see Exhibit 4-1), the sample mean annual rate of utilization per household (3.64 episodes of illness treated per year per household), and the sample mean out-of-pocket fee per episode of 3,852 *sucres*, this would add an estimated 1,618,364 *sucres* to revenue (i.e., 824,775 *sucres* in membership dues and 793,589 *sucres* in copayments. However, increasing the referral rate per episode from 5.1 to 8 percent would add an estimated 35.4 referrals per year per dispensary, at an average cost of 80,237 *sucres* per referral, or an estimated increase in costs of 2,840,390 *sucres* per dispensary.

5.0 SUMMARY AND CONCLUSIONS

5.1 BACKGROUND

Ecuador's Rural Social Security program (*El Seguro Social Campesino del Ecuador*, or SSC) was founded in 1968 to provide basic protection to a segment of the rural population against risks associated with illness, maternity, old age and disability. SSC provides a limited package of primary health services to its 822,809 members through a network of 549 7-room dispensaries staffed by physicians (general practitioners) and nurse auxiliaries. Although SSC has been successful in attracting members, its current goals include: (1) increasing the utilization of SSC dispensaries; (2) expanding coverage to a larger share of the rural population; (3) expanding and diversifying its sources of financial support; and (4) placing greater emphasis on preventive health. SSC officials seek an improved understanding of why current levels of utilization are low and have been declining over time. Possible explanations offered have included: (1) long distances between members' homes and SSC dispensaries; (2) member preferences for other providers; (3) lack of outreach services and health promotion activities; and (4) irregular hours of work by physicians.

Against this background, the current study is designed to:

- ▲ achieve a better understanding of the factors which determine the utilization of SSC health services on the part of both the insured and uninsured populations;

- ▲ investigate the willingness of SSC members to pay a higher share of the costs of the health care they receive at SSC dispensaries; and

- ▲ explore policy options to increase the utilization of SSC dispensaries and to finance the expansion of SSC services to a larger segment of the rural population, particularly the poor.

The fact that health care utilization is significantly higher among SSC members suggests that one way to increase the utilization of SSC dispensaries is to increase the proportion of the rural population affiliated with SSC. One policy option to attract more members may be to lower SSC fees, including both annual membership dues and out-of-pocket fees (copayments) charged to some members in connection with actual use of services (e.g., fees charged by SSC for prescribed drugs). However charging lower fees to attract more members may entail loss of revenue unless the price elasticity of the demand for membership is greater than unity. It is also likely to increase costs, due to higher utilization. Alternatively, it may be possible to increase SSC membership by improving the quality of care provided at SSC dispensaries. Quality improvement would be expected to increase both utilization and revenue, but it may also increase costs. The extent to which quality improvement is an effective option for attaining SSC goals will depend on the responsiveness of the population (both members and non-members) to quality improvements relative to the cost of such improvements. A combination of price increases designed to pay for quality improvements may be the most effective policy option. The present study is intended to evaluate these and other policy options available to SSC to attain its policy objectives.

5.2   POLICY ISSUES

Exhibit 5-1 lists six policy options available to SSC and indicates their likely impact (+ = increase, - = decrease, ? = unknown) on three of SSC's objectives: (1) increase utilization of SSC facilities; (2) expand SSC membership; and (3) promote SSC financial sustainability (ie., increase SSC net income).[35] The expected effects of these seven policy options on each of these three policy objectives are as follows:

▴   ***Reduce SSC dues.*** This policy should expand membership, thereby increasing the utilization of SSC facilities. Its effect on SSC revenue is indeterminate. It will depend on the price elasticity of demand for SSC membership (i.e., the percentage increase in members resulting from a given percentage decrease in dues). The effect on SSC net income will depend on whether marginal revenue (which could be negative) is higher than the marginal cost of treating additional members.

▴   ***Reduce out-of-pocket fees charged to some SSC members.*** This should increase both utilization rates (i.e., visits per member household) and service delivery costs. Its effect on SSC net income will depend on the price elasticity of demand for services among SSC members and on marginal cost. In addition, lower out-of-pocket fees charged to members should boost membership (with additional increases in utilization and costs), since the benefits of membership are a function of the difference between what members pay in comparison to what non-members pay for health care.

▴   ***Reduce out-of-pocket-costs to non-members.*** The effect of this change on utilization and net income is indeterminate. Lower out-of-pocket costs to non-members should encourage greater utilization on the part of non-members, but it will also increase costs and reduce the benefits of SSC membership, possibly reducing the number of SSC members and leading to offsetting reductions in utilization. The effect on net income is indeterminate but is likely to be negative (a necessary condition for it to be positive is the unlikely event that the price elasticity of demand for SSC services among SSC non-members is greater than unity). With costs increasing and revenue likely to decrease, the direction of the effect on SSC's net income is expected to be negative.

▴   ***Improve the quality of care at SSC facilities.*** Improving the quality of care at SSC facilities should increase utilization of SSC facilities by both members and non-members. In addition, better quality services should expand SSC membership, producing further increases in utilization. The effect on SSC net income is indeterminate; it will depend on how the expected increases in revenue compare to the costs of quality improvement and to marginal service delivery costs.

▴   ***Use fee increases to pay for quality improvements.*** Quality improvements can be paid for by raising either membership dues or user fees (copayments). The net effect on utilization and membership will depend on the relative magnitudes of the price and quality elasticities of demand and membership. The effect of such a combined policy on

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[35] The present study could not address the fourth SSC objective, i.e., increasing the use of preventive care, due to inadequate data.

net income will depend on whether the net effect on membership and utilization is positive and on the marginal cost of supplying additional services.

▲ *Increase the referral rate.* It has been said that an important motive households have for joining SSC is to gain access to IESS facilities on referral. If this is the case, increasing the proportion of patients referred to IESS facilities should increase both membership and utilization. The effect on net income is indeterminate a priori but will depend on the elasticity of membership with respect to increases in the referral rate, as well as the cost to SSC per patient referred.

▲ *Use fee increases to pay for increased referrals.* If fees are increased to pay for the cost of additional referrals, SSC membership will be likely to increase, but the effect on utilization and net income is indeterminate.

EXHIBIT 5-1 EXPECTED IMPACT OF POLICY CHANGES ON SSC UTILIZATION, MEMBERSHIP, COSTS AND REVENUE			
Policy	Utilization of SSC facilities	SSC Membership	SSC Financial Sustainability (net income)
Reduce SSC membership dues	+	+	?
Reduce out-of-pocket fees charged to SSC members	+	+	?
Reduce out-of-pocket fees charged to SSC non-members	?	—	—
Improve the quality of SSC services	+	+	?
Improve the quality of SSC services while simultaneously raising fees to cover the full cost of the quality improvements	?	?	?
Increase the referral rate	+	+	—
Increase the referral rate while simultaneously increasing fees to recover the costs of additional referrals	?	+	?

The present study constitutes an empirical study of the relationships depicted in *Exhibit 5-1*. Specifically, it attempts to: (1) test for the expected positive or negative effects suggested by economic theory; (2) establish the existence of positive or negative effects in cases where theory alone is ambiguous concerning the expected direction of impact; and (3) provide at least tentative quantitative estimates of the magnitude of these effects.

5.3   METHODOLOGY

The study works with three empirical models. The first two analyze the factors determining the demand for health care from SSC facilities, while the third analyzes the factors which determine the decision to join SSC. The first of the two empirical demand models involves a logit analysis of the decision to seek health care away from home when ill. The second is a discrete choice model explaining the choice of provider when ill, including the home care alternative. The logit model is simpler than the discrete choice model and provides a fairly clear understanding of the factors determining the utilization of SSC services by its members. However, even for SSC members, it fails to register the effects of possible substitution across providers, as a possible response to price and quality changes. For example, a reduction of 10 percent in SSC out-of-pocket fees charged to SSC members for services (i.e., copayments) may increase the probability of seeking care outside the home by 5 percent (implying a price elasticity of 0.5), but it might also hypothetically produce an equivalent increase in SSC utilization if SSC members switch from other providers to SSC dispensaries (implying a total price elasticity equal to one). The logit model would fail to register the second of these effects, whereas the discrete choice model would (in principle) register it correctly. The third empirical model, which concerns the decision to join SSC, is estimated because of the important role which SSC membership plays as a determinant of the utilization of SSC facilities.

All three empirical models are estimated using data from a 1994 survey of 1,017 households residing in the service areas of nine SSC dispensaries as well as data on inputs and services collected directly from the sampled dispensaries. Both surveys were conducted jointly by CEDATOS (*Centro de Estudos y Datos*), an Ecuadorean firm, and Abt Associates Inc., as part of a larger USAID/Ecuador-funded study of the SSC carried out under the USAID-funded Health Finance and Sustainability (HFS) project. The two data sets have several attractive features for demand analysis: (1) availability of quality assessments for preferred health providers; (2) information on the type, duration, and severity of illness; (3) strong representation within the sample of households having insurance (i.e., SSC members); and (4) data on input costs related to quality improvements. At the same time, the household survey in particular has a number of important limitations: (1) the number of sample clusters is relatively small, reducing the degree of precision associated with the estimates; (2) expected price, distance (or time), and quality of care measures had to be imputed for providers other than the preferred provider (i.e., the nearest SSC dispensary for SSC members, or the provider respondents identified as the one they "generally visited," in the case of non-members); and (3) there was only limited information collected on the individual characteristics of those reported to have been ill (e.g., information on education was collected only for the head of household).

5.4   SPECIFIC FINDINGS

The study's specific findings include descriptive evidence of a general nature and estimates obtained from each of the three empirical models.

5.4.1   General Findings

▲   The 1,017 surveyed households reported that a total of 1,284 household members were ill during the sixty days preceding the survey, 65 percent of whom reported their illnesses to involve infections (including parasites), respiratory, or digestive disorders. Care outside the home was sought by 76 percent of those ill; but 79 percent of SSC members sought care, compared to only 67 percent of non-members.

▲   Of those seeking care outside the home, most SSC members (76 percent) were treated at SSC dispensaries, compared to only 17 percent of non-members, who were more likely to be treated at a public health center/subcenter (27 percent), a general hospital (21 percent), or at a private clinic (29 percent).

▲   The out-of-pocket costs for health care of SSC members are only about one-third those of non-members. Approximately 80 percent of out-of-pocket health care expenditures by both SSC members and non-members go to purchasing medications.

▲   Respondents rated the quality of care at SSC dispensaries about even with that at public health center/subcenters and somewhat lower than that at private clinics and general hospitals.

5.4.2   Decision to Seek Care Outside the Home

▲   The estimated effect of out-of-pocket fees paid on the decision to seek care among SSC members was found to be negative and statistically significant, with an estimated elasticity at the sample mean of -0.079.[36] This finding suggests that a policy of decreasing out-of-pocket costs to SSC members would not have much impact on utilization and would result in reduced revenue. On the other hand, it suggests that a policy of raising fees to recover additional costs associated with possible quality improvements might succeed in improving net income without having a large negative impact on utilization.

▲   The estimated effect on demand of an index of perceived quality of care was positive, but only marginally significant for SSC members.[37] However, the decision to seek care on the part of SSC members was positively and significantly related to a dispensary's consumption of drugs and supplies per SSC member household (estimated elasticity = 0.118) and to the number of hours worked by physicians (estimated elasticity = 0.109).

▲   There was a strong positive relationship between SSC affiliation and the decision to seek care in the full sample. This finding suggests that SSC membership increases health care

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[36]   The estimated price coefficient is *positive* and statistically significant for the SSC non-member subsample. Although this finding is contrary to prior expectations, the non-member sample is much smaller (N = 282 versus N = 774 for the member sample), and the price and quality variables are less clearly defined in the case of SSC non-members (i.e., they refer to the most "generally used" provider).

[37]   This finding is with respect to a quality of care index based on respondent ratings of six characteristics (i.e., waiting time, convenience of hours, availability of drugs, availability of medical equipment, quality of treatment, and staff competency). In variants of the basic model, which involved substituting measures of the individual quality components for the index, the only consistently significant individual quality measure was that related to the availability of drugs.

utilization, at least with respect to curative care. It is consistent with a large body of health economics research which shows that insurance has a positive effect on levels of health care utilization (i.e., "moral hazard").

▲ Surprisingly, no significant relationship was found between income and the decision to seek care outside the home. There was, however, a strong positive relationship between both the length and severity of illness and the decision to seek care, as expected.

▲ No significant relationship was found between the referral rate and the decision to seek care on the part of SSC members.

▲ Fairly strong evidence of gender bias, favoring male children over female children and other household members, was encountered with respect to the decision to seek care outside the home. (However, as discussed below, this finding was not supported by estimates obtained with the choice of provider model.)

▲ Education of the head of household (particularly secondary education) was positively and significantly related to the decision to seek care. This finding is consistent with similar studies in other settings.

▲ The black population was significantly more likely to seek care than either Indian or mixed populations. At the same time, those who reported speaking a combination of Quechua and Spanish or only Quechua, as compared to those who reported speaking only Spanish, were significantly less likely to seek care outside the home. However, it is noted that these ethnic and language groups were concentrated in a few clusters, so that these variables may be proxying for unobserved community-level factors (e.g., unobserved characteristics of the supply environment).

▲ Consistent with reasons given by survey respondents for not seeking care, neither distance nor expected travel time was significantly related to the decision to seek care. However, expected out-of-pocket travel expenses were negatively related to the decision to seek care.

▲ Neither attendance at social promotion meetings nor knowledge of presentations by SSC dispensary staff on the services provided by SSC was significantly related to the decision to seek care by SSC members.[38]

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[38] There was, however, a strong positive relationship between a reported visit of the SSC doctor to the household during the preceding two months and the decision to seek care. However, it is not clear how to interpret this finding. Does it reflect housecalls in some cases (which would imply reverse causality), or does it signify a personal friendship (rather than an outreach effort)?

5.4.3   Choice of Provider

▲   The estimated effect of expected fees on the probability of selecting a particular health provider was negative and statistically significant, as expected and consistent with findings obtained with the decision to seek care model. However, the estimated elasticity for a change in the level of out-of-pocket fees charged for SSC services was only -0.079 at the sample mean (i.e., exactly the same price elasticity estimate obtained with the decision to seek care model discussed above).[39] These results again suggest that lowering out-of-pocket fees to SSC members would not be a very effective way to increase utilization, since the effect would be small while revenue would decrease. However, they also suggest that raising out-of-pocket fees might be an effective way to promote financial sustainability or to pay for quality improvements, without having a strong negative effect on utilization levels.

▲   The quality of care index was positively and significantly related to the probability of selecting a given provider.[40] The estimated elasticity at the sample mean was quite high (1.355), suggesting that improving the quality of care in SSC dispensaries would be an effective way to raise utilization levels.

▲   SSC membership was strongly and positively related to the probability of selecting an SSC provider. The estimated elasticity at the sample mean was 0.914, suggesting that expanding SSC's membership would be an effective measure to increase utilization of its facilities.

▲   Income was negatively related to the choice of an SSC dispensary in the full sample (but not in the SSC member subsample), suggesting that higher-income SSC non-affiliates tend to select non-SSC treatment options.[41]

▲   Measures of both the length and severity of illness were strongly and positively related to the choice of a modern provider outside the home. This result is consistent with findings obtained with the logit model explaining the decision to seek care.

▲   The choice of provider model provided no evidence of gender bias in the demand for health care (as was encountered with the decision to seek care model). However, the estimated coefficients suggest some tendency for children of both genders to receive care

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[39] The fact that the estimated price elasticity in the choice of provider model is the same as that obtained with the decision to seek care model discussed in the previous section is somewhat surprising. The price elasticity in the choice of provider model reflects the combined effect of a price reduction on the decision to seek care outside the home as well as the effect of any substitution across providers. Apparently, price changes do not lead to much substitution among providers in this setting.

[40] Again, the availability of drugs was the only consistently significant quality of care factor, when individual quality of care components were specified in place of the quality of care index. Unfortunately, there were no data on inputs for facilities other than SSC dispensaries, so the effect of varying quality-related inputs on demand could not be estimated with the choice of provider model, as was done with the decision to seek care model.

[41] However, with the sample restricted to SSC members, income was positively and significantly related to the choice of a private provider, suggesting that substitution of a non-SSC provider occurs among higher-income households even when affiliated to SSC.

from relatively inexpensive providers (i.e., SSC dispensaries and public health centers/subcenters).

▲ The education of the head of household was not found to be a significant factor affecting the choice of provider.

▲ Distance was significantly and positively related to the choice of provider. This finding is not surprising, however, given the number of household survey respondents who indicated preference for providers on the basis of their proximity.

5.4.4   Decision to Affiliate with SSC

▲ The level of annual dues was not found to be significantly related to the probability of SSC membership. Although this result would appear to be counter to theoretical expectations, it may be that some or all of the reported dues are paid by employers or other third parties.

▲ Although the expected differential in the out-of-pocket cost of health care between SSC members and non-members was found to be only marginally significant as a determinant of the probability of SSC affiliation, its positive estimated coefficient is counter to prior expectations. Taken at face value, these results suggest that increases in out-of-pocket charges to SSC members would *increase* the probability of affiliation with SSC.

▲ SSC membership is positively and significantly related to the perceived quality of care in SSC dispensaries. The estimated elasticity at the sample mean is 0.939 suggesting that quality improvements may be an effective measure to increase SSC membership.

▲ SSC membership is positively and significantly related to the proportion of clients who are referred by the nearest SSC dispensary. The estimated elasticity at the sample mean is 0.352.

▲ Income is negatively and significantly related to SSC affiliation, suggesting that SSC services are viewed as a low-cost, low-quality form of health care. This finding is consistent with other evidence obtained in this study.

▲ Households in which the head of household is working in agriculture are significantly more likely to be affiliated with SSC, even after adjusting for education and income.

▲ Black ethnic affiliation is negatively and significantly related to SSC membership. However, as noted above, this relationship may be due to the fact that the black population in the sample is found in only one cluster, so that black ethnic affiliation may be proxying for other unobserved community-level factors.

▲ Distance and expected travel costs to the nearest SSC dispensary are positively related to the probability of affiliation with SSC (although only the relationship with travel costs is statistically significant). These results are contrary to a priori expectations; and, coupled with other unexpected findings described above, cast additional doubt on the correctness of the specification of this model and on the reliability of the results obtained with it.

5.5   OVERALL CONCLUSIONS

Exhibit 5-2 summarizes the conclusions reached by the present study within the policy impact framework presented in *Exhibit 5-1*. It is clear from examining these conclusions that the study points to quality improvement linked to cost recovery as the most effective policy for SSC to pursue. Price effects were found to be quite small (possibly due in part to the fact that the fees currently charged by SSC are relatively low compared to those of other providers).

In contrast, the potential impact of quality improvements was found to be substantial:

- ▲ The results obtained with the logit model determining the decision to seek care away from home (section two) suggest that quality improvements—both increased availability of drugs and supplies and increased hours worked by physicians—would substantially increase the utilization of modern health services by SSC members. For example, increasing both quality measures from their sample means to the highest levels actually observed among the nine sample SSC dispensaries would increase utilization by 15 percent. In the absence of fee increases, however, this would produce a decline in net income (i.e., revenue would increase by 717,748 *sucres* in the typical SSC dispensary, while costs would increase by 8,452,224 *sucres*). However, if out-of-pocket fees to SSC members were increased sufficiently to cover the *full cost* of these quality improvements, there would still be a net increase in utilization of 12 percent. Moreover, since average out-of-pocket fees would in this case more than cover marginal costs, the net income of SSC dispensaries would be expected to increase as the result of this policy measure.
- ▲ The combined results of the choice of provider and decision to affiliate with SSC models similarly suggest that raising the perceived quality of care index for SSC dispensaries from its sample mean to he highest level observed in the sample would increase utilization of SSC dispensaries by 33 percent. Increasing out-of-pocket fees charged to SSC members sufficiently to pay for these quality improvements would still lead to a 28 percent increase in utilization and to an overall increase in net income.

Our overall conclusion is, therefore, that investing in improved quality, but with the full costs of quality improvements recovered by user fees, would simultaneously promote all three of the SSC objectives considered by this study, i.e., increasing utilization, increasing coverage, and improving financial sustainability.

		EXHIBIT 5-2	
	STUDY CONCLUSIONS WITH RESPECT TO THE IMPACT OF POLICY CHANGES ON SSC UTILIZATION, MEMBERSHIP, AND FINANCIAL SUSTAINABILITY		
Policy	Utilization of SSC facilities	SSC Membership	SSC Financial Sustainability
Reduce SSC membership dues	Since no effect of dues on membership was found, no increase in utilization would be expected to occur.	The study did not find a significant relationship between SSC dues and the decision to affiliate with SSC. However, this finding may reflect the possibility that dues are paid in some cases by employers and other third parties.	If the findings of the study are interpreted literally, reducing dues would lead to decreases in net income.
Reduce out-of-pocket costs of SSC services to members	The study found that reductions in out-of-pocket costs to members would have a significant but relatively small effect on utilization by SSC members (the estimated price elasticity was only -0.079).	The study did not find a significant relationship between out-of-pocket charges to members and the decision to affiliate with SSC.	Revenue and net income would fall with lower out-of-pocket fees to members.
Reduce out-of-pocket costs of SSC services to non-members	The subsample of non-SSC members was too small to permit separate estimation of the effect of SSC fees on demand by non-members.	The study did not find any evidence that lower out-of-pocket fees charged to non-members would impact adversely on SSC membership, as was expected theoretically.	No information obtained in the present study.
Improve the quality of SSC services	The study found strong evidence that quality improvements lead to increased utilization. In the logit model, elasticity estimates for quality improvements were 0.118 and 0.109. In the discrete choice model, elasticity estimates were 1.34 for the full sample and 1.32 for the SSC subsample.	The study found strong evidence that quality improvements lead to increased SSC membership. The estimated elasticity was 0.939.	The study found that net income would decrease with quality improvements in the form of increased availability of drugs and supplies and increased hours of work by physicians because the cost of these quality improvements would be higher than the additional revenue they would be expected to produce.
Improve quality of care while simultaneously raising user fees to recover the full cost of the quality improvements	The study found that utilization would still increase in this case.	The study found that SSC membership would increase significantly as the result of this policy, due to the strong positive relationship between quality and SSC membership and due to the absence of any significant price effect on membership.	Net income would rise as the result of this policy.
Increase the referral rate in SSC dispensaries	Utilization increases due to increased SSC membership. No effect on the utilization rate.	There is a strong positive relationship between the referral rate and SSC membership (estimated elasticity = 0.352).	Net income decreases because the cost of the additional referrals exceeds the additional revenue from the new members.
Increase the referral rate in SSC dispensaries while simultaneously raising fees to recover the full cost of the additional referrals	Utilization increases due to increased SSC membership. Utilization declines slightly due to increased fees.	SSC membership increases, as above.	Net income increases.

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REFERENCES

CEDATOS. 1994. El Seguro Social Campesino del Ecuador: Estudio sobre Costos y Demanda de Servicios de Salud, por Dispensario. Technical Note (draft dated December, 1994), Health Finance and Sustainability Project, Abt Associates Inc., Bethesda, MD.

Cochran, W.G. 1963. *Sampling Techniques*. Second edition. New York: John Wiley & Sons, Inc..

Greene, William H. 1993. *Econometric Analysis*. Second edition. New York: Macmillan Publishing Company.

Knowles, James C. 1995. Price Uncertainty and the Demand for Health Care in Developing Countries. *Health Policy and Planning* (forthcoming).

Population Reference Bureau. 1994. *World Population Data Sheet*. Washington, DC: Population Reference Bureau, Inc.

Theil, Henri. 1971. *Principles of Econometrics*. New York: John Wiley & Sons, Inc..